TROPICAL DISEASES BUREAU.

TROPICAL DISEASES BULLETIN.

Vol. 11.] 1918. [No. 6.

TROPICAL DISEASES OF THE SKIN.

KING (W. W.). **Some Observations upon the Skin Diseases of Porto Rico.**—*Jl. Cutan. Dis. Including Syph.* 1917. Aug. Vol. 35. No. 6. (Whole No. 417.) pp. 459–478. With 2 plates.

The chief value of this paper lies in the personal experience of the incidence of skin diseases in Porto Rico. Pyosis tropica, a group of diseases which includes the chronic ecthymatous ulcerations, was very common, as indeed were all pyogenic conditions. The author questions whether there is a specific ulcer which deserves the name of "ulcus tropicum." Oriental sore, Leishmaniasis, was not met with. Sporotrichosis was suspected in a few cases but its presence was never demonstrated. Oidiomycosis (ulcerations shewing yeast organisms), occurred more than once, but it is explained that this may have been the result of a contamination. The incidence of ringworm is particularly interesting. Tinea capitis and tinea barbae were very rare. Tinea corporis was very common, and especially in the form of tinea cruris, of the clinical type now often described as "eczematoid ringworm of the groin and extremities," and due usually to the Epidermophyton, much less often to the Trichophytons. Of the latter, tinea flava was the most frequent. Trichomycosis, formerly better known under the name of "Lepothrix," was very prevalent especially of the red variety. Blastomycosis, which the author with his American experience was naturally on the look out for, was not found. It is again interesting to note that psoriasis was only twice encountered, and scabies and pediculosis were uncommon. A curious and perhaps specific verruca occurring on the feet and hands was very prevalent, but specificity was not definitely established. Uncinariasis, due to infection by the American hook worm, was very widespread, and seems to have been frequently associated with pellagra. Filariasis was common.

Syphilis was extensively distributed and of an early-ulcerative type. Yaws on the other hand was rare. Leprosy has become much less prevalent, a result, as the author suggests, of segregation.

E. G. Graham Little.

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HILL (Chas. H.); SOUTER (C. H.); MALCOLM (Robert A. G.). **Barcoo Rot.** [Correspondence].—*Med. Jl. Australia.* 1917. Sept. 29. Vol. 2. 4th Year. No. 13. p. 283; Oct. 20. No. 16. p. 347

PAIN (Francis); STANNUS (H. S.). **Barcoo Rot (Veldt Sore).**—*Brit. Med. Jl.* 1917. Oct. 6. p. 468; 1918. Feb. 23. pp. 231–232.

Hill, after a long experience, recommends the administration of hypophosphites, with no local treatment beyond the protection of the ulcers from flies, etc.

Souter derives the word Barcoo from Barcoo Creek, which he places in New South Wales, and recommends the administration of sulphate of calcium in one grain pills two or three times a day, combined with local treatment directed to prevent further infection of the sores.

Malcolm supports the latter measure, and ascribes the causation to exposure under dry atmospheric conditions.

Pain expresses the opinion that "Barcoo Rot" as originally experienced by older bushmen was scurvy; at present the term is used for any obstinate "sore"; most of the cases are actually staphylococcic or trichophytic infections.

Stannus (of Nyasaland) supports the view that diminished resistance in the individual contributes to the severity of the infection and finds malaria and scurvy the most important contributory causes. He found an ointment of 20 gr. to the ounce of Acid. Sal. "uniformly successful." [See also this *Bulletin*, Vol 10, p. 207.]

E. G. G. L.

PRIESTLEY (Henry). **Ringworm and Allied Parasitic Skin Diseases in Australia.**—*Med. Jl. Australia.* 1917. Dec. 8. Vol. 2. 4th Year. No. 23. pp. 471–475. With 13 figs.

The first part of this paper is a good "text-book" description of methods of examination and classification of ringworm fungi. The author describes minutely two species which he claims as "new," isolated in Townsville. The first grew a yellow or white culture, with red discoloration of glucose agar media. The second was probably an Epidermophyton.

E. G. G. L.

PAUL (C. Norman). **A Ringworm Epidemic presenting a New Type of Fungus.**—*Med. Jl. Australia.* 1917. Dec. 15. Vol. 2. 4th Year. No. 24. pp. 496–497. With 3 figs.

A widespread epidemic amongst persons handling wheat was traced to mice, as the carrier; a fungus was grown on proof media, the culture assuming a purple-lake colour on the 8th day. It is a new variety of the Gypseum group.

E. G. G. L.

PIJPER (A.). **Tinea imbricata in South Africa.**—*Jl. Trop. Med. & Hyg.* 1918. Mar. 1. Vol. 21. No. 5. pp. 45–47. With 3 figs.

——. **Some Unusual Infections. VI.—Tinea imbricata**—*Med. Jl. S. Africa.* 1917. June. Vol. 12. No. 11. pp. 176–177. With 1 fig.

Both these papers refer to the same case, a Mapoch-kaffir, aged 40–50, from whom fungus-bearing scales were removed, and by an

ingenious device a pure culture in glucose broth of fungus uncontaminated by other organisms was obtained. This was successfully regrown on Sabouraud's solid proof medium, but no experiments at inoculation of human beings were attempted. Demonstration is therefore lacking as to the isolated fungus being actually the cause of the disease, but the cultural and clinical characteristics are, the author thinks, sufficiently like those described in Tinea imbricata to warrant the identification he claims to make.

E. G. G. L.

PUPO (João de Aguiar). **Frequencia da Sporotrichose em S. Paulo.** [The Frequency of Sporotrichosis in San Paulo.]—*Ann. Paulist. Med. e Cirurg.* 1917. Mar. Year 5. Vol. 8. No. 3. pp. 53–68. With 10 figs.

Notes of 20 cases of sporotrichosis occurring in the author's practice, most of which were very successfully treated by endovenous injections of iodide of sodium in doses of 5 to 10 cubic centimetres of a 10 per cent. solution, the chief difficulty being to get the patients to attend the out-patient department with proper regularity. The 20 cases occurred among a total of 5,500 out-patients treated in the course of two years at a Clinique for Diseases of the Skin and Syphilis, which gives an idea of the frequency of the affection in Brazil. The paper is illustrated by a number of very good photographic reproductions of characteristic lesions. The common Sporotrichum of Brazil is *S. beurmanni.*

J. B. Nias.

CHALMERS (Albert J.) & ARCHIBALD (R. G.). **Mycetoma and Pseudomycetomatous Formations.**—*New Orleans Med. & Surg. Jl.* 1917. Nov. Vol. 70. No. 5. pp. 455–475. With 3 plates.

Chalmers and Archibald contribute an important paper on the classification and description of this group which they define as follows.

"The term *Mycetoma* includes all growths and granulations which produce enlargement, deformity or destruction in any portion of the tissues of men, or animals, and which are caused by the invasion of the affected area by fungi, belonging to different genera and species, which produce bodies of varying dimensions, color and shape composed of hyphae, and sometimes chlamydospores, embedded in a matrix. These bodies, which are capable of giving rise to mycelial filaments on germination, are termed *grains* and are found either embedded in the pathological tissue forming these growths and granulations, or escaping freely in the discharge therefrom."

A second group of cases in which the grains are smaller or not identified, but in which fungus is found, the authors propose to classify as paramycetoma. A third group of cases with clinical resemblances to the two classes described, but without demostration of the fungus causation they call pseudomycetoma. The mycetomata may be divided into two great classes, 1. Grains containing large segmented mycelial filaments—Maduromycoses. 2. Grains containing very fine segmented mycelial filaments looking like bacilli embedded in a matrix—Actinomycoses.

The Maduromycoses may be further differentiated by the colour of the grains, into (1) black, (2) white or yellow and (3) red varieties.

These again may be classified according to their geographical distribution, as European, Asian, African and American, and there are numerous individual species of each, named for the most part after the recorder.

The Actinomycoses may be similarly divided, into (1) black, (2) yellow, and (3) red, (sometimes yellowish) varieties.

The Paramycetomata may show one or more of the following four macroscopical characters :—

1. Presence of eosinophil bodies, the so called Russell bodies, which the authors regard as a chemical defence provided by the fungus.
2. Nocardial filaments.
3. Minute grains containing Nocardial filaments.
4. Very rarely, other organisms, septate and broader than a Nocardia or Streptothrix.

The Pseudomycetomata include a number of clinical conditions such as malignant tumours, yaws, etc., which need not be further specified.

The treatment recommended for all forms of mycetoma is early and complete removal with the lymphatic glands in connection with the growth. Where removal is impossible, the administration of large doses, such as ninety grains per diem, of potassium iodide, and the administration of autogenous vaccines may be of some use in Actinomycoses, but no measure short of removal has been of use in the Maduromycoses.

E. G. G. L.

MIESCHER (Guido). **Ueber einen Fall von Mycetoma pedis nostras. Verursacht durch eine neue pathogene Streptothrix, nebst Bemerkungen zur Systematik der Trichomyzeten (Streptothrix, Aktinomyzes).** [A Case of Mycetoma pedis nostras. Caused by a New Streptothrix.]—*Arch. Dermat. u. Syph. Orig.* 1917. Vol. 124. No. 2. pp. 297–442. With 5 plates.

This is an elaborate and very long paper describing a new case and classifying the previous cases recorded. It contains a very detailed research on the new observation. The patient was a man aged 50, a native of Italy, who had lived during the thirty years preceding the observation in Basel. In 1914 a tub containing ice was dropped on his foot, causing a haematoma on the dorsum, with swelling, but no wound. Some six months later a nodule had developed on the site, and this was incised, and was found to contain blood-stained pus in which very small yellow bodies were present from which cultures were made ; Miescher claims that he has thus isolated a new Streptothrix, which as it forms very warty growths he names *Streptothrix verrucosa.* It was grown in numerous media, in pure culture, producing salmon-red to brick-red colonies ; it is aerobic, growing best on carbohydrate and bouillon, less well on serum, agar, and gelatine. Conidia were not found, and aerial hyphae were inconstant. A very characteristic feature on which the author insists much is the early fragmentation of the mycelium, so that bodies like bacilli and cocci result. The organism is Gram positive, and holds Ziehl's stain. In dogs, cats, and doubtfully in guinea pigs inoculation produced granulation tumours, from which the same fungus was recovered in pure culture.

The treatment adopted combined internal administration of large doses of potassium iodide with local application of a pyrogallol gelanthum, by which the patient was "clinically" cured. Some recurrences were treated in the same way, and the patient ultimately died of tuberculosis three years after the initial accident.

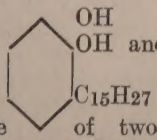
E. G. G. L.

DE KORTÉ (W. E.). *Nocardia cylindracea*: **A South African Otomycosis.**—*Ann. Trop. Med. & Parasit.* 1918. Jan. 31. Vol. 11. No. 3. pp. 265–278. With 2 plates.

A man aged 50 while loading forage pricked his ear, which subsequently swelled and discharged, the discharge smelling of "old boot leather." Under large doses of potassium iodide, 45 grains subsequently increased to 90 grains per diem, improvement after six months was so slow that a vaccine was tried, prepared from an acidfast organism obtained from the pus. There was a severe local and constitutional reaction, and ultimately a considerable improvement in the local symptoms, but the patient's health suffered from the inoculations and they were stopped, and the case was lost sight of. From a sixty days old culture obtained from the pus an acid-fast bacillus was grown after 60 days aerobic incubation, producing an "old leather like" smell. This form the author calls the Oidial. From the same original culture from the pus after 220 days, a growth of non-acid-fast spore-bearing hyphae was obtained; this the author calls the Arthroidial. Grain-like bodies were also observed consisting of Gram-negative non-acid-fast "mycelium," like actinomycosis hominis. This mycelium the author regards as an artificial product. The phases of the parasite were conditioned by age and environment; from the appearance of the original growth in glucose-agar shake cultures, when curved lamellae developed, the author names the organisms "cylindracea." He suggests that the "mycelium" and "arthroidial" may be heteroecious phases in another host, i.e., forage.

E. G. G. L.

TOYAMA (I.). **Rhus Dermatitis.**—*Jl. Cutan. Dis. Including Syph.* 1918. Mar. Vol. 36. No. 3. (Whole No. 424.) pp. 157–165.

Toyama discusses the injurious principle in rhus plants, six species of which grow wild in Japan, the most familiar to us being the *Rhus toxicodendron.* The subject has a special industrial importance in Japan as the native lacquer contains this injurious ingredient. The author offers very convincing arguments for the view that the active principle is a chemical product, urushiol, obtained from the sap of the lacquer tree. This product caused the same effects as the rhus plants. The formula of urushiol is stated to be 

and the author ascribes its special toxicity to the presence of two hydroxyl radicals and an adjoining unsaturated alkyl radical. The poisonous principle is non-volatile, but the action may be produced apparently at a

distance, an effect which is explained by the carriage of small particles of the irritating substance by wind or insects. New lacquer ware is more likely to produce ill effects than old. Nevertheless the author was able to prove experimentally that an ethereal solution of lacquer derived from an antique vase buried a thousand years ago retained its poisonous qualities.

Lacquer dermatitis is best treated by the application of an alkaline solution, which neutralises the urushiol, and the removal of traces of lacquer by a 10 per cent. solution of nitric acid in alcohol.

E. G. G. L.

McNair (James B.). **The Poisonous Principle of Poison Oak, Non-Bacterial.**—*Med. Record.* 1917. June 16. Vol. 91. No. 24. (Whole No. 2432.) pp. 1042–1043.

McNair in this paper adduces some sound arguments for the non-bacterial nature of the poison of Rhus plants, the most convincing of which is the indestructibility of the injurious principle by prolonged heat or exposure to antiseptics.

E. G. G. L.

Leger (M.) & Mouzels (P.). **Dermatose prurigineuse déterminée par des Papillons saturnides du genre** *Hylesia.*—*Bull. Soc. Path. Exot.* 1918. Feb. Vol. 11. No. 2. pp. 104–107. With 1 fig.

This relates to a personal experience of one of the authors in French Guiana who suffered an attack which was traced to a butterfly crushed against his waistcoat. Two other similar cases are recorded. The active principle seems to be a chemical irritant extracted by water but not by alcohol, and probably conveyed by the minute spicules which constitute the velvety down on the abdomen and wings and are easily detached. The insects are said to belong to the family Saturnidae, genus *Hylesia*, or one nearly allied to it.

E. G. G. L.

Ōhno (Takeshi). **Ueber den giftigen Nachtschmetterling im Präfektur Niigata. (I. Mitteilung).** [A Poisonous Moth in Niigata.] [Japanese text.]—*Japan. Ztschr. f. Dermatol. u. Urol.* 1917. July. Vol. 17. No. 7. pp. 599–609. With 1 plate. [Author's summary in German p. 26.]

Ohno has conducted a morphological, biological and experimental research on a poisonous moth found especially in the summer in Niigata. The powder from the wings and body of this moth produces in contact with human skin a violent urticarial eruption, histological sections of the skin shewing all the appearances of acute urticaria. Examination of the powder shews the presence of numerous microscopic needle-like bodies with a pale violet fluid substance in the lumen, and the irritant effect is probably to be explained by a combined mechanical and chemical cause. Numerous experiments with animals failed to afford any means of producing immunisation against the irritant.

E. G. G. L.

SCHMITZ (Franz). **Akute hämorrhagische Nephritis nach Raupenurtikaria.** [Acute Haemorrhagic Nephritis following Caterpillar Urticaria.]—*Münch. Med. Woch.* 1917. Nov. 27. Vol. 64. No. 48. p. 1558.

A doctor was the subject of a severe urticaria as the result of contact with a hairy caterpillar prevalent in Rumania, and known to produce this symptom. The eruption faded in about five days, but was followed by an acute haemorrhagic nephritis, with severe constitutional symptoms, albuminuria persisting for several weeks.

E. G. G. L.

CHALMERS (Albert J.) & KING (Harold H.). **Blister Beetles as a Public Nuisance.**—*New Orleans Med. & Surg. Jl.* 1917. Nov. Vol. 70. No. 5. pp. 445–455. With 6 figs.

This paper describes an epidemic of a bullous eruption which occurred in Khartoum in August 1916, and was caused by contact with beetles two species of which were identified, *Epicauta sapphirina* and *Epicauta tomentosa.* It was principally confined to Europeans, was met with in Egyptians but not in natives of the Soudan. The epidemic ceased in about four weeks with the disappearance of the beetles.

E. G. G. L.

VON BASSEWITZ (E.). **O Micuim.** [Micuim.]—*Brazil Medico.* 1917. Apr. 7 & 14. Vol. 31. Nos. 14 & 15. pp. 115–116; 122–124.

"Micuim" is the popular name in Brazil of the larval hexapod stage of an Acaroid insect which the author has not been able hitherto to identify perfectly. It is very abundant in dry summers in the grass of many districts of Brazil and, being carnivorous, attaches itself to the skin of both human beings and animals. It is of a bright red colour, about 0·35 mm. broad by 0·5 mm. long, having three pairs of legs which are terminated by three claws. In the middle of the back are two bright red spots which are the organs of vision. The insect is very active and can travel over a distance of 15 centimetres in a minute, as the author has observed. Its colour is due to an oily secretion upon the skin. It ranges rapidly all over the body of the individual attacked, particularly affecting the folds of the thinner portions of the skin, and by its biting or scratching it causes an intense dermatitis, very similar to that which is caused by the ordinary harvest-bug. It does not appear actually to suck blood, as no red cells are to be found in its intestine. Probably it feeds upon the exuded serum of the skin. The author's endeavours to grow this parasite into the perfect sexual form have not hitherto been successful, so that its classificatory position still rema ns doubtful. The adult insect presumably lives on plants. The "Micuim," according to the author, cannot be identified with *Tetranychus molestissimus* (WEYENBERGH), which in the adult stage is found upon the plant *Xanthium macrocarpum,* this insect being known in Brazil by the separate name of "Carrapicho." Specimens of Micuim larva sent to the eminent acarologist G. HALLER by Dr. Carlos BERGH were simply referred by him to the genus *Tetranychus*

The symptoms occasioned by this Acarus larva seem to have been first described by the French botanist Auguste DE SAINT-HILAIRE, as long ago as 1821, in his *Voyage a Rio Grande do Sul* (p. 266). The dermatitis caused by the irritation and scratching may prove fatal to old and debilitated individuals in the human subject, and amongst quadrupeds and poultry a similar result may occur. Several parasiticides can be used with good effect against the condition, the best being tincture of benzoin, or balsam of Peru, and the powder and tincture of pyrethrum. Solution of menthol in vaseline is also good, and relieves the itching at the same time. More popular remedies are rum or an alcoholic tincture of tobacco, and creolin soap.

J. B. N.

TOTSUKA (R.). **[Oil Eczema, a Kind of Skin Disease produced by Continued Contact with Turpentine, Kerosene and Machine Oils.]**—*Hifukwa Hitsunyokwa Zasshi* (*Japan. Ztschr. f. Derm. u. Urol.*). 1917. May 20. Vol. 17. No. 5. pp. 1–56. With 8 figs.

[From Review by R. G. MILLS.]

This is an occupation dermatitis with which we are familiar in our industrial centres. It is a more or less chronic folliculitis resulting from an irritative inflammation of the hair follicle. Machine oils are the most effective in producing it. Women are more subject to it than men, and there is probably an individual idiosyncracy.

E. G. G. L.

SPICK. **Traitement de l'ulcère phagédénique des pays chauds.**—*Caducée.* 1917. Aug. 15. Vol. 17. No. 8. pp. 101–103.

Spick writes on this subject with an experience much enlarged by the movements of native troops occasioned by the war; he recommends the following treatment. The wound is cleaned with hydrogen peroxide and the edges cut with scissors, the surface dried and powdered freely with iodoform. A red hot cautery is then passed over the iodoform in the wound by which means clouds of nascent iodine are generated. The wound is then again powdered with iodoform and covered with sterile gauze. The aseptic dressing is renewed daily and every fourth day the cauterisation of the iodoformed surface is repeated. In seven cases arsenobenzol was used as well, in intravenous injections, four doses respectively of 15, 30, 45 and 60 cgms. being given at six days interval.

E. G. G. L.

GOLDBERG (L.). **Beitrag zur Therapie des Ulcus tropicum phagedaenicum (Jemen).** [The Treatment of Phagedenic Ulcer.]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1917. May. Vol. 21. No. 9. pp. 154–156. With 2 figs.

Goldberg in this communication describes the cure of a longstanding phagedenic ulcer of the foot, in which a spirochaete and fusiform bacillus had been identified, treatment having consisted in the local application of an ointment of neosalvarsan ½ per cent. and nitrate of silver. Healing took place within 2½ months, although the ulceration had been present for 26 years.

E. G. G. L.

SILVA (Flaviano). **O azul de methyleno no tratamento da ulcera tropical phagedenica.** [Methylene Blue in the Treatment of Tropical Ulcer.]—*Brazil Medico.* 1917. Apr. 14. Vol. 31. No. 15. pp. 124–125.

A case of ulcer of the foot successfully treated by the local application of methylene blue. The diagnosis was verified microscopically by the finding of *B. fusiformis* and its associated spirillum in the discharge. The borders of the ulcer having been excised, the surface of the sore was covered with a layer of cotton wool soaked in a 2 per cent. watery solution of methylene blue. The dressing was changed every day, and the sloughs carefully picked off. Immediate relief to the symptoms was obtained, and ultimately the surface cicatrized completely. Microscopic examinations made during the process of cure showed that the bacilli disappeared first, whilst the spirilla remained present longer.

J. B. N.

CURJEL (Dagmar Florence). i. **Ulcerating Granuloma of the Pudenda.** —*Indian Med. Gaz.* 1917. Sept. Vol. 52. No. 9. pp. 305–310. ii. **Treatment of Ulcerative Granuloma.** [Correspondence.]—*Ibid.* Oct. No. 10. p. 379.

i. Curjel contributes in this paper a personal experience of twenty cases of granuloma inguinale, all in women, and suggests that a specific virus, not however identified, is the cause, and that it is venereal in origin. Contrary to the experience of the disease hitherto seen chiefly in males, there was enlargement of the inguinal glands, but there was no evidence of systemic infection. An unusually large proportion of the cases shewed a positive Wassermann reaction, to be explained probably as due to a concurrent syphilitic inoculation. Treatment recommended consists in the application of X-rays, or the excision of the affected parts.

ii. The author here comments on the treatment of ulcerative granuloma by intravenous injection of antimony, which requires to be pushed to limits of toleration and probably acts as a general protoplasmic poison, with no specificity.

E. G. G. L.

PIJPER (A.). **On the Aetiology of Granuloma venereum.**—*S. African Med. Rec.* 1918. Jan. 26. Vol. 16. No. 2. pp. 20–26. With 3 figs.

The author reviews the literature and describes a new case of this disease occurring in a Kaffir. Smears taken from the surface revealed no specific organism, some spirochaetes of the *Spirochaeta buccalis* type excepted. Cultures from the deeper parts were negative. Sections of the skin shewed elongated interpapillary processes, with in places destruction of the epithelium. Numerous mitoses were found. Enormous numbers of plasma cells were seen in the cellular infiltration of the corium. Parasites like those described under the name of Donovan bodies were found in the epithelial cells in some parts.

E. G. G. L.

ARAGÃO (Henrique de Beaurepaire). **Notes on Granuloma Venereum.**—*New Orleans Med. & Surg. Jl.* 1917. Oct. Vol. 70. No. 4. pp. 369–374. With 2 plates & 7 text-figs.

Granuloma venereum seems to be especially common in Brazil. Aragão refers to fifty cases having been treated with tartar emetic, which he recommends in the form of intravenous injections of a 1 per cent. solution, 10 to 12 cc. being a usual dose, and a course of ten or twelve injections, to be repeated if necessary, is recommended. X-rays should where obtainable be given in addition. The author regards the Donovan bodies as being the true cause of the disease and describes very fully the characteristics of the microbe in the tissues, and he appears to have succeeded in growing it freely on all the usual laboratory media, with characters very like those of Friedlander's bacterium. Inoculations from cultures of this organism were fatal to laboratory animals, but inoculations of granulomatous tissue did not produce the disease.

E. G. G. L.

DARWENT (E. N.). **Notes on a Case of Ulcerating Granuloma treated by Intravenous Injections of Tartar Emetic.**—*Trans. Soc. Trop. Med. & Hyg.* 1917. July. Vol. 10. No. 8. p. 198.

The patient was a negro man with ulcerating granuloma pudendi. Doses of one third of a grain of "tartar emetic" were given at intervals of two, and later of three days, intravenously, and the parts locally treated with caustics. After eight injections the ulceration had soundly healed.

E. G. G. L.

BLANCHARD (M.). **Un cas d'Oerbiss ou pseudo myiase rampante à Grand-Bassam (Côte d'Ivoire).**—*Bull. Soc. Path. Exot.* 1917. Oct. Vol. 10. No. 8. pp. 725–726.

Blanchard reports a case of this affection from Bassam, on the right foot of a man of forty who was accustomed to walk barefoot in his garden, a circumstance which gives some support to BÉRANGER-FÉRAUD's view that the disease is contracted by contact with damp earth. Cure was effected by opening up the furrows of the disease and painting with 20 per cent. nitrate of silver, at the same time encircling the lesions with a ring of the same solution.

E. G. G. L.

MACFIE (J. W. S.). **A Case of Larbish or Oerbiss observed in Northern Nigeria.**—*Jl. Trop. Med. & Hyg.* 1918. Feb. 1. Vol. 21. No. 3. p. 25. With 1 fig.

Macfie reports a case of this disease in a male European in Northern Nigeria. The lesion began on the dorsum of the right foot near the toe. Its advance was irregular in rate and direction, and formed a zigzag across the sole of the foot and inner margin. Repeated examinations were made of the seropurulent fluid found in the vesicular part of the raised line which constitutes the lesion, but no parasites were found and no light was thrown on the causation.

E. G. G. L.

ROTH (O.). **Zur Kenntnis der Dermatomyiasis.**—*Dermat. Woch.* 1917. Nov. 17. Vol. 65. No. 46. pp. 1031–1035. With 2 figs.

Roth reports a remarkable case of a man being attacked by the larvae of the *Lucilia Caesar*, a fly which lays its eggs frequently on the bodies of dead animals but very seldom on living human beings. The patient had for three weeks slept on the bare ground in a wood. The larvae were found in the genital area, where the skin was much reddened and swollen. They were about 1½ cm. long and half their body was buried in the skin; when removed by forceps a punched out hole was left, extending into the connective tissue. They shunned the light, moved very actively, and produced a slimy excretion like a weeping eczema. A phlegmonous swelling followed in the sites attacked which disappeared with antiseptic treatment. Over a hundred larvae were removed with forceps; in some cases they were found buried entirely under the skin. They apparently produced a secretion capable of dissolving the integument, and when placed on dead meat produced liquefaction. Larvae removed from the patient were found to have the stomach and intestines filled with fresh blood.

E. G. G. L.

SAKURANE (K.). [**"Creeping Disease" and its Possible Relation to Ligula Infection.**]—*Hifukwa Hitsunyokwa Zasshi* (*Japan. Ztschr. f. Derm. u. Urol.*) 1917. May 20. Vol. 17. No. 5. pp. 66–67.

[From Review by R. G. MILLS.]

Sakurane, from observation of a case of a swelling on the skin from which he removed a Ligula parasite, offers the suggestion that the parasite in creeping disease is of this nature, the clinical resemblances having impressed him.

E. G. G. L.

MURAKAMI (F.). [**"Creeping Disease." A Linear Circinate Disease of the Skin. An Abstract.**]—*Hifukwa Hitsunyokwa Zasshi* (*Japan. Ztschr. f. Derm. u. Urol.*) 1917. May 20. Vol. 17. No. 5. p. 65.

[From Review by R. G. MILLS.]

The patient, a male Japanese of otherwise good health and negative history, noticed one day a raised line on the breast near the nipple. This gradually spread in length, in circles, loops and various curves until it had covered a considerable portion of the breast. The point of advance was reddish or slightly brownish, and the colour gradually changed to dark brown in the older portions. The line was about the size of a match stick, a little raised and often nodular in character, although all the spots were directly in line. Itching was somewhat annoying. Unfortunately the patient refused to have a bit of tissue excised for examination. The lesion cleared up under an antiseptic ointment.

E. G. G. L.

PIJPER (A.). **The Aetiology of Craw-Craw.**—*Jl. Trop. Med. & Hyg.* 1917. Nov. 1. Vol. 20. No. 21. pp. 242–244. With 2 figs.

Pijper claims to have isolated a bacterium from the nodules of an eruption which he considered an example of craw-craw, using that

term in the restricted sense advocated by CASTELLANI whose description he follows. Proof however of the connection of the bacterium with the causation is lacking, as the organism was not identified in sections of the skin, and although inoculations of the culture into the skin and veins of rabbits were followed by the development of nodules similar clinically to those of the human case, the bacterium was not recovered from these experimentally produced growths.

E. G. G. L.

CHALMERS (Albert J.) & KAMAR (A.). **Further Notes on Keratodermia punctata.**—*Jl. Trop. Med. & Hyg.* 1917. Oct. 1. Vol. 20. No. 19. pp. 218–219.

This is a short note, differentiating keratodermia punctata from yaws, chiefly on the ground that hyperkeratosis of the palms, common in keratoderma punctata, is not described in yaws, and from CASTELLANI'S keratoma plantare sulcatum which is restricted to the feet.

E. G. G. L.

CHALMERS (Albert J.) & INNES (Arthur). **"Scarlet Fever-Like Eruptions" in the Tropics.**—*Jl. Trop. Med. & Hyg.* 1917. Sept. 1. Vol. 20. No. 17. pp. 193–197.

The authors draw a distinction between the mild hyperaemia common in the tropics, associated often with the taking of drugs like quinine, of transient duration and without desquamation, which they propose to call erythema scarlatiniforme, and a more severe definite inflammation, with desquamation and sore throat, very difficult to differentiate from true scarlet fever, which they call dermatitis scarlatiniformis. Examples of both types are given. These eruptions have sometimes coincided with the finding of bacilli in the throat, sometimes with chemical causes, and the differences in the two groups are of degree, not of kind. True scarlet fever on the other hand is extraordinarily rare in the Tropics. It is to be differentiated from the rashes mentioned above by several features, of which the most important are appearance of the eruption within 48 hours of the sore throat, the severe type of the latter, the strawberry tongue, headache, vomiting, circumoral pallor, albuminuria, and infectivity, all of which are absent in the rashes with which the paper deals. The rarity of scarlet fever in the tropics is to be kept in mind throughout; this diagnosis should not be made unless the evidence is very clear.

E. G. G. L.

CHALMERS (Albert J.) & ARCHIBALD (R. G.). **Localized Gangrenous Vaccinia.**—*Jl. Trop. Med. & Hyg.* 1917. Oct. 1. Vol. 20. No. 19. pp. 217–218.

The most careful aseptic precautions were observed in effecting the operation of vaccination in this case (a European lady in Khartoum). On the fifth day the patient felt ill and had slight fever, which rose on the sixth day to 102°, and on the seventh day to 105°. On the eighth day there was a black slough two inches in diameter in the vaccinated site, surrounded by a ring of vesicles and a red to purple area of skin

3 inches wide. The temperature fell to 103°, and the patient felt better. On the 13th day she developed an attack of acute gout, the left hip, left arm, left side of the jaw, left wrist, the back and the right ribs being chiefly affected. This attack subsided in about seven days, during which the slough came away, and the surrounding inflammation subsided. The authors attribute these very unusual results of vaccination to the diminished resistance produced by the latent gout. The treatment adopted, which was entirely successful, was to keep the leg exposed to the air in an elevated position, and to apply to the site powders, lead lotion and finally calamine lotion which was found most satisfactory of all. The gout was treated by the usual therapy.

E. G. G. L.

BHARUCHA (E. S.). **Note on a Case of Ainhum.**—*Indian Med. Gaz.* 1917. Nov. Vol. 52. No. 11. pp. 403–404. With 2 figs.

The disease affected the left little toe, the patient, a Hindu male, having lost the right little toe from a similar cause. Clinical appearances supported the diagnosis of ainhum, but the pathological report on the amputated toe suggested syphilis, marked artero-sclerosis being present. The Wassermann test was not made.

E. G. G. L.

TAKAHASHI (S.). [**Orange Colored Skin Disease. Case Report with Suggestions as to Pathogenicity.**]—*Jikwa Zasshi* (*Jl. Pediatrics*) 1917. May 20. No. 204. p. 66.

[From Review by R. G. MILLS.]

Takahashi reports a case of orange discoloration of the skin of the palms, the face and the feet of three months duration in a girl aged 6 years. The shade of colour differed from that of catarrhal jaundice. Later there appeared a consolidation at the apex of the lung, some dilatation of the liver, and a roughening of the valvular sounds of the heart.

The discolouration was described, on what would seem very insufficient evidence, to the circumstance that the child ate oranges freely. The causation was not further elucidated.

E. G. G. L.

VAN DEN BRANDEN (F.). **Syphilides psoriasiformes confluentes chez un Noir.**—*Bull. Soc. Path. Exot.* 1917. Oct. Vol. 10. No. 8. pp. 688–689.

This is a short report, with photograph, of a syphilide in a negro, simulating, in a part of the eruption, psoriasis; elsewhere showing characteristic features, and disappearing after two injections of "salvarsan cuprique."

E. G. G. L.

BOUFFARD (G.). **Chéloïde géante chez un indigène du Dahomey.**—*Bull. Soc. Path. Exot.* 1917. Nov. Vol. 10. No. 9. pp. 814–815. With 1 fig.

This tumour reached from the lobe of the right ear to the navel, having taken ten years to grow to this size. It was excised with complete success and found to consist entirely of fibrous tissue.

E. G. G. L.

KNOWLES (Frank Crozer). **Acnitis in the Negro.**—*Jl. Cutan. Dis. Including Syph.* 1917. Feb. Vol. 35. No. 2. (Whole No. 413.) pp. 61–65. With 1 plate & 1 fig.

The chief interest of this communication lies in the race of the patient, a negro; acnitis would seem to be rare in dark skinned peoples. The clinical and histological description presents no new features.

E. G. G. L.

BERNSTORFF. **Ueber Krätze in der Türkei während des Krieges.** [Itch in Turkey during the War.]—*Münch. Med. Woch.* 1917. Dec. 11. Vol. 64. No. 50. p. 1606. With 2 figs.

The author notes the severity of the secondary contamination of scabies prevalent among the poorer Turks, but the note offers no special interest.

E. G. G. L.

KRITZLER. **Bild eines Falles von Gangosa.** [A Case of Gangosa.]—*Ztschr. f. Arztliche Fortbildung.* 1918. Jan. 1. Vol. 15. No. 1. pp. 6–7. With 1 fig.

Kritzler contributes an illustration of this disease occurring in a patient in a Rabaul hospital; there is no indication where the disease was contracted and no details are given.

E. G. G. L.

LEPROSY.

LEGER (Marcel). **La Lèpre à la Guyane française et ses réglementations successives.**—*Bull. Soc. Path. Exot.* 1917. Oct. Vol. 10. No. 8. pp. 733–749.

This paper fully discusses the question of leprosy in French Guiana. In spite of the numerous Rules and Regulations which have been enacted since 1716 when it attracted serious attention, the disease has not decreased in the colony. It was not indigenous, but was supposed to be introduced by Dutch Jews, expelled from Brazil, who settled in the neighbourhood of Cayenne in the latter part of the 17th century. The author refers to a large number of writers on the subject, and the various suggestions and enactments which have been made up to the present time, apparently with but little success. Recent authorities—MM. KERMORGANT, CLARAC, PAIN, THÉZÉ and HENRY estimate the total number of lepers in the Colony at from 300 to 350, or about 12 per 1,000 : about half of these are in the neighbourhood of Cayenne. New cases are still being discovered—5 recently by the author himself.

The terrible conditions existing at the leper settlement at Acarouany, and its failure at remedying or arresting the spread of the disease in the Colony are strongly animadverted upon. The author urges that greater publicity should be given to the whole question, and the population enlightened, and that several leproseries should be established where hygienic measures and scientific investigations can be carried out, and the patients so humanely treated that they will voluntarily become inmates. Home treatment under suitable conditions and medical supervision should be allowed—much on the plan which has proved so successful in Norway.

P. S. Abraham.

DENNEY (Oswald E.). **A Statistical Study of Leprosy in the Philippine Islands from the Histories of Ten Thousand Cases isolated in the Culion Leper Colony.**—*Jl. Amer. Med. Assoc.* 1917. Dec. 29. Vol. 69. No. 26. pp. 2171–2174.

Individual records of some 10,425 lepers have been kept at the Culion Leper Colony in the hope that facts of interest and of possible bearing on the transmission of leprosy might be obtained. The results are interesting, although, as the author observes, no facts have been found which furnish conclusive evidence as to the transmission of the disease. Table I gives the age at which infection is assumed to have taken place—or rather the time at which the first symptom was recognised :—

Ages 1 to 5 years	0·72 per cent.
„ 6 „ 15 „	24·30 „ „
„ 16 „ 35 „	50·87 „ „
„ 36 and over	24·10 „ „

About half the cases at Culion have been diagnosed in adolescence. These figures are remarkably similar to the statistics published by McCOY in the Hawaiian Islands in 1914 [see this *Bulletin*, Vol. 6, p. 115].

Table II gives the distribution of leprosy among members of families. Twenty-nine per cent. have given a definite history of previous contact with at least one leper relative. Nearly two-thirds of the cases were between relatives of like sexes. Thirty-five per cent. of the cases giving histories of contact with a single leper relative were sisters and brothers, 27 were cousins, 11 per cent. leper children and 7 per cent. leper parents. Tables III to VII illustrate these points.

Thirty-four per cent. of these cases were married before admission: of these only 1 per cent. were both infected. 66·7 of the patients at Culion were males.

The average duration of the disease has been 7·3 years. Mortality among children born of leper parents is high: 10·4 per cent. of those living in the colony have become infected with the disease, and of those born of parents one of whom is a leper and living among lepers for from 7 to 10 years 44 per cent. Only 2 employees of the colony have become infected—one a Caucasian ecclesiastic after 5 years' residence, the other a Filipino who came from an infected family and exhibited the symptoms in one year. The average number of non-leprous employees in the colony is 200—30 of whom have been there for 10 years.

Several other points of interest are discussed in this important paper, e.g., the food question, transmission by insects, climate, &c., to which the author attaches no etiological importance.

P. S. A.

GOODHUE (E. S.). **The Molokai Leper Settlement.**—*Med. Record.* 1917. Oct. 13. Vol. 92. No. 15. (Whole No. 2449.) pp. 629–632. With 5 figs.

In this short paper, Dr. E. S. Goodhue gives a very interesting and sympathetic illustrated account of the Molokai Leper Settlement. The successful labours of Mr. McVEIGH, the lay superintendent, and of Dr. Will GOODHUE, the medical superintendent, are specially alluded to in reference to the comfort and happiness of the afflicted residents; and it is interesting to know that cases are still being discharged as cured. Dr. W. GOODHUE's excellent operative results have already been alluded to in this *Bulletin.* As the author observes, there is probably no place in the world, no other leper colony, so advantageously placed by nature, more tactfully or scientifically maintained or so carefully and conscientiously provided for. "It is an evolution through a series of experiences and processes, to be sure, and credit is due to many men, boards, and legislatures; but it must be conceded that the best ameliorative measures are of comparatively recent date, and are due to the initiative of two or three men."

P. S. A.

LIE (H. P.). **Einiges von der Uebertragbarkeit der Lepra, insbesondere ihrer makulo-anästhetischen Form.** [The Transmissibility of Leprosy, especially the Maculo-Anaesthetic Form.]—*Dermat. Woch.* 1918. Jan. 5. Vol. 66. No. 1. pp. 1–14.

Dr. Lie is a strong advocate of the contagion theory of leprosy, and in this paper brings forward several points which in his opinion confirm

his view. He refers to instances where a leprosy-free district has developed the disease subsequent to the advent of a leper, and gives a short account of a number of cases which he considers must have arisen through contagion. He emphasises the fact that an absolutely definite proof is impossible in these cases, considering the prolonged latency and incubation period of the disease. He contests the idea that leprosy does not pass from man to wife: Dr. SAND's statistics gave 3·32 per cent. of such instances, and his own observations give nearly 6 per cent.—a figure much higher than that among patients with tuberculosis—a malady admittedly of greater infective activity—viz., 3 per cent.

He maintains that there is always a danger of contagion even from the maculo-anaesthetic cases—seeing that bacilli have frequently been demonstrated in the superficial lesions of such patients. Several other points bearing on the subject are ably discussed in this paper.

P. S. A.

McCoy (G. W.). **The Diagnosis of Leprosy from a Public Health Standpoint.**—*New Orleans Med. & Surg. Jl.* 1917. Oct. Vol. 70. No. 4. pp. 364–369.

Dr. McCoy emphasises the importance of a correct diagnosis in cases of leprosy; for if an error is made serious results may ensue to the individual who is deprived of his liberty, as well as to the community who have to support him. The problem moreover differs from that of other contagious diseases inasmuch as there is much difference of opinion among authorities as to whether all cases need isolation. He compares leprosy with tuberculosis and plague in which only certain types—pulmonary cases of tubercle with open lesions and pneumonic plague—are regarded as a menace to others. The opinions of several leprologists are quoted who consider that nerve leprosy cases are not infective to others.

The diagnosis of leprosy is not always easy. Even if acid-fasts are found in a nasal smear caution must be exercised; the bacilli of avian tuberculosis and other acid-fasts may be present. Cases are mentioned in which such errors in diagnosis have been made. A positive diagnosis may often have to be deferred for months until the typical and undoubted acid fasts can be demonstrated. Serological tests can only be regarded as corroborative. If a patient gives a positive Wassermann as well as complement deflection with old tuberculin as antigen, the evidence for leprosy is strong.

In the author's view, cases in which leprosy bacilli cannot be found are not dangerous from a public health point of view; and even if a patient has been previously positive both clinically and microscopically he might be released if found negative by the microscope. There are a few cases in which, in spite of every examination, it is impossible to make a certain diagnosis; the author would then give the patient, and not the public, the benefit of the doubt. In non endemic foci a missed case does no harm, and in endemic foci an additional doubtful case will be of no material consequence.

P. S. A.

PALK (C. Leet) & BRYSON (R.). **Early Diagnosis of Leprosy.**—*Indian Med. Gaz.* 1917. Sept. Vol. 52. No. 9. pp. 316–317.

In 1915 Major NEVE discovered by radiography changes in the bones in an early case of leprosy. To see whether skiagrams would be of use in detecting early or suspicious cases, the authors examined 63 lepers in the Madras leper hospital—their ages ranging from 7 to 60 years. Of 12 early nodular cases, 4 exhibited changes and 8 were negative; 12 advanced nodular cases were all positive. In 15 early anaesthetic cases, 14 were negative and 1 positive; in 12 advanced anaesthetic cases, 10 were negative. Six early mixed cases were all negative, and of 6 advanced mixed cases 4 were positive.

The percentage in all 63 cases was :—

Early, 84·8 negative and 15·1 positive.
Advanced, 13·3 negative and 86·6 positive.

These results show that leprosy cannot in any form be diagnosed with certainty in its early stages by X-ray examination of the bones of the extremities.

Nasal smears from all these 63 cases were examined for bacilli: 77 per cent. were positive and 22 per cent. negative. The authors question whether sufficient importance is attached to the possibility of leprosy being an air-borne disease—affecting the Schneiderian membrane in an early stage.

Six servants who had been attending on lepers in the hospital for periods ranging from 13 to 36 years were negative both as regards X-rays and nasal bacilli.

P. S. A.

KRAUS (Rudolf). **Ungelöste Probleme der Lepra-Forschung.** [Unsolved Problems in Leprosy.]—*Wien. Klin. Woch.* 1917. Oct. 4. Vol. 30. No. 40. pp. 1253–1256.

This paper purports to be a resumé of the present state of knowledge in connection with leprosy. The author observes that there are many problems which must be regarded as still unsolved: viz. (1) the cultivation of the bacillus; (2) its inoculability in animals; (3) the means of its communication from man to man; (4) the biological diagnosis of leprosy; (5) its etiology; (6) prophylaxis; and (7) specific treatment. He discusses recent work under each of these heads.

Importance is attached to UHLENHUT and STEFFENHAGEN'S granules found, by using "antiformin," in the lepra bacilli from nasal mucous membrane, and to KEDROWSKI'S cultivations and inoculations —although the author does not consider the matter proved. He suggests that more than one microbe may be causal.

P. S. A.

DE BUEN (Sadi). **Estudios sobre la lepra en España.** [Studies on Leprosy in Spain.]—*Bol. Inst. Nac. Higiene de Alfonso XIII.* 1917. Dec.

In this paper the author continues his studies on leprosy in Spain. In tubercular leprosy (11 cases) he finds that the Wassermann reaction is always positive, while in the anaesthetic form (3 cases) it was negative

in 2 out of 3. In 10 cases of mixed type it was positive in 6 out of 10. Treatment with chaulmoogra oil does not affect the result. Of 25 bugs that were examined after biting leper patients, only one was found to contain leprosy bacilli in the intestine. On the other hand, out of 50 flies, captured while feeding on the ulcerated surfaces of open sores, 28 were found to contain leprosy bacilli, i.e., more than half.

J. B. Nias.

MacCallum (W. G.). **Leprosy.**—*Proc. New York Path. Soc.* 1916. Vol. 16. p. 185.

At a meeting of the New York Pathological Society, Dr. MacCallum exhibited slides illustrating forms of leprosy seen in Fiji, Java, Bali, Singapore and Kuala Lumpur, and described the microscopical characters of lesions from two autopsies at Singapore. He laid especial stress on the great amount of fat globules in the large vacuolated bacilli-bearing cells as well as in the other cells found in the leprous tissue. This is well shown by staining with "Sudan"—giving a bright red colour to the tissue. He believes that this abundance of fat globules in the leprous cells has not been recognised, and suggests that the fat may have some protective relation to the bacilli.

P. S. A.

Climenko (Hyman). **Syringomyelia and Leprous Neuritis.**—*New York Med. Jl.* 1917. Sept. 29. Vol. 106. No. 13. (Whole No. 2026.) pp. 596–598. With 2 figs.

This paper records a case illustrating the difficulty of establishing a diagnosis where many symptoms of both leprosy and syringomyelia are present. A man aged 58, born in Minnesota, had some form of infection of the arms 33 years ago, since when the symptoms had gradually developed. For the last 3 years he had defective speech and dysphagia. Romberg, spastic and ataxic gait, head bent forward with limited movement, lordosis at the mid-dorsal spine, atrophy of the sternocleidomastoid muscles, nystagmus and anaesthesia over back of phalanges and palms of hands and over front of thighs, legs and feet, were all present. Heat and cold could not be distinguished on the upper extremity, and the feet. There was some senile atrophy of the skin on the left side of the face, a small leucodermic patch on the neck, and patches of pigmentation on the hands. On the chest was a dark red maculo-papular eruption. The right shoulder was fixed. The fingers of both hands were greatly deformed, atrophy of the thenar muscles, but not of the interossei. The phalanges were permanently flexed and paw-like, with trophic changes in the nails and scaliness of the skin. A Wassermann reaction was negative, and examination of the nasal secretion for leprosy bacilli was negative.

The author considers that while the onset of the disease, the frequent attacks of fever, the tuberculous eruption of the chest, paralysis of right facial nerve, point to leprosy, the nystagmus, difficulty in swallowing, husky voice, impotence, negative Wassermann and absence of nasal lepra bacilli speak for syringomyelia, with unusual type of deformity resulting in paw hand.

P. S. A.

HOFFMANN (Erich). **Tuberkuloseähnliche Gewebsveränderungen bei Syphilis, Lepra und Sporotrichose.** [Tissue Changes resembling Tuberculosis in Syphilis, Leprosy and Sporotrichosis.]—*Deut. Med. Woch.* 1917. June 28. Vol. 43. No. 26. pp. 806–808.

The histological examinations of the author show that the characteristic appearances of the tuberculous nodule or "tubercle" may be simulated in the nodular growths of leprosy, lupoid syphilis, experimental sporotrichosis, and other mycotic diseases—thereby confirming the views of F. LEWANDOWSKY, JADASSOHN and others. In these cases the lupoid structure may be due to the comparative paucity of bacilli or the weak virulence of the virus.

P. S. A.

GOTTHEIL. **Lepra tuberosa et mutilans.**—*Jl. Cutan. Dis. Including Syph.* 1917. Apr. Vol. 35. No. 4. (Whole No. 415.) pp. 267–268.

The patient a female aged 54, Russian, was shown at the Manhattan Dermatological Society. She had been affected for 15 years and had been practically blind for 10 years. She came to America 8 years ago passing the immigration office inspection without trouble, although blind and with nodular lesions on the face, &c. It was an extensive case of the ordinary nodular type, with ulceration of the joints of the fingers, clawing of hands and feet, &c.

P. S. A.

PERNET (G.). **A Case of Lepra.**—*West London Med. Jl.* 1917. Vol. 22. p. 133.

The lesions started late in 1916—two years after leaving the Gold Coast, where the patient had lived off and on for 15 years. In 1915 he contracted syphilis, treated with salvarsan and mercury by Dr. DOBSON. The Wassermann reaction was negative. The first lesion was a small round spot on the cheek gradually enlarging, then a ring like eruption on the left elbow showing anaesthesia and dissociation of sensation—other patches subsequently appearing. No information is given as to the presence of bacilli.

P. S. A.

CLEVES VARGAS (Carlos J.). **Formas curables de lepra.** [Curable Forms of Leprosy.]—*Repertorio de Med. y Cirug.* 1917. July. Vol. 8. No. 10. (No. 94.) pp. 458–465.

Remarks on the possibility of curing leprosy when taken early, with notes of the case of a man, aged 55, who had shown symptoms of macular leprosy for 5 years. He was taken into the leper hospital of Agua de Dios, in April 1914, and subjected to a systematic course of treatment, consisting principally in the use of chaulmoogra oil and hot baths. At the end of three years, in April of the present year, he was subjected to a careful scrutiny by the four physicians attached to the hospital with a view to his discharge, and was pronounced completely cured.

J. B N

MEIER FLÉGEL (E.). **Informe que presenta a la Academia Nacional de Medicina el doctor E. Meier Flégel sobre el tratamiento de la lepra.** [Report on the Treatment of Leprosy in Cuba.]—*Gac. Med. de Caracas.* 1917. June 15. Vol. 24. No. 11. pp. 94–96.

The author, having returned from Havana, reports on the treatment of leprosy employed in the leper hospital there, as follows :—

1. Reliance is principally placed on the use of Chaulmoogra oil, in the dose of 100 to 200 drops per diem.

2. Hot baths of decoction of red mango every night, with soaping with sulphur-soap.

3. Nasal douches three times daily with oxygen water.

4. A tumblerful of a 3 per cent. decoction of red mango three times daily.

5. The use as a beverage during the day of a decoction of sarsaparilla, Triticum repens, and a Cuban species of Polypodium (Doradilla). This is thought to aid the digestion of the Chaulmoogra oil.

Hypodermic injections of Chaulmoogra oil have been found painful, and have been largely given up. Intravenous injection of the oil has been tried by Dr. VAHRAM, in a dose of 0·00002 gramme per kilo of body weight, that is to say in the twentieth part of the toxic dose [see this *Bulletin*, Vol. 8, p. 247]. The oil is triturated with gum arabic to form an emulsion, and then sterilized, the initial volume of emulsion for a dose being 1 cc., raised gradually by one-tenth cc. to a maximum of 2 cc. This dose is maintained to the 20th injection, and the intravenous is then exchanged for the hypodermic method, by which the quantity of emulsion given can be gradually raised to 5 cc. The author does not say for how long this method of treatment is to be continued. In general the successful cure of a case of leprosy at Havana takes three years.

J. B. N.

ROGERS (Leonard). **Two Years Experience of Sodium Gynocardate and Chaulmoograte Subcutaneously and Intravenously in the Treatment of Leprosy.**—*Indian Jl. Med. Res.* 1917. Oct. Vol. 5. No. 2. pp. 277–300. With 6 plates.

The author here gives a summary of his work in this connection commenced in 1915. At first he employed the gynocardate orally and subcutaneously, but during the last 14 months chiefly by intravenous injections—with most encouraging results and no ill effects beyond temporary giddiness, headache and occasional localized clotting. He has found the sodium salts of the higher melting point acids of chaulmoogra distinctly more efficient than those reported on in his previous communications.

He gives in this paper brief notes of all the cases, 26, which he has treated for 3 months or more, and tabulates the results.

His conclusions are :—

"1. A year's further experience has confirmed my observation that intravenous injections of the sodium salts of the fatty acids of chaulmoogra oil obtained from the seeds of *Taraxtogenos Kurzii* produce reactions in leprous tissues with breaking down of the acid-fast bacilli, which reactions are followed by great improvement.

"2. The higher melting point acids, which furnish sufficiently soluble salts (melting points of from 49° to 62° C.) are considerably more active than the lower 37° C. melting point acids first used by me for injection.

"3. Subcutaneous injections do not produce reactions in the leprous tissues and are less effective than intravenous ones.

"4. Prolonged oral administration in quantities of 20 grains and upwards daily has a good effect, especially if intravenous injections have previously been given and also in conjunction with them.

"5. Between 1 and 2 years were required to cause the lesions to disappear in the successful cases, but this period may possibly be reduced by the use of the more active higher melting point preparations, which have only been under trial for the last 6 months.

"6. The lesions have disappeared in 50 per cent. of cases treated within 3 years of the onset of the disease, including cases treated for only 3 to 12 months, but in cases of from 3 to 15 years' duration, only 25 per cent. cleared up under the treatment.

"7. The most active constituent of the oil has not yet been obtained in a pure state; so further investigation on the same lines may possibly yield still better results in the near future."

The paper gives details as to dosage and technique of the injections, and is copiously illustrated with photographs and drawings.

P. S. A.

SPITTEL (R. L.). **Sodium Gynocardate in Leprosy.** [Correspondence.] —*Indian Med. Gaz.* 1918. Jan. Vol. 53. No. 1. p. 33.

Mr. Spittel, Surgeon, General Hospital, Colombo, has not had encouraging results with intravenous injections of gynocardates. It had occurred to him before Sir L. ROGERS' paper was published to inject a soap made with the fatty acids of chaulmoogra, and a solution was prepared at the Government Laboratory. It was not satisfactory, and he, therefore, tried ROGERS' preparation—a 2 per cent. stock solution in doses of 1 to 10 cc. The reactions were always more or less severe even in small doses, but in no case after a course of several months did benefit result. The patients suffered from chills, fever, headache, pains all over the body, vomiting etc. Gastritis was frequent and distressing.

P. S. A.

STÉVENEL (L.). **Essais de traitement de la lèpre par des** *injections intraveineuses d'émulsion d'huile de Chaulmoogra.* — *Bull. Soc. Path. Exot.* 1917. Oct. Vol. 10. No. 8. pp. 684–687.

In consequence of the well known drawbacks to the internal and intramuscular administration of chaulmoogra oil, the author in conjunction with Dr. NOC prepared a very fine emulsion in 1911, which was tentatively tried intravenously in animals and in a case of leprosy with encouraging results in Martinique. It contained 5 cc. of the oil in 150 cc. of "physiological serum." One cc. of an emulsion containing 2 cc. of the oil in 5 cc. of distilled water proved fatal in a rabbit. The original weaker emulsion was employed in cases of leprosy in 5 cc. doses intramuscularly, subcutaneously and also by the mouth in doses of 2 teaspoonsful daily. In 1916 an improved emulsion was prepared at the Institute of Hygiene in Martinique, containing 5 cc. of the oil emulsified in 150 cc. distilled water with normal soda solution. The oil is vigorously agitated with the soda solution drop by drop, and

when of creamy consistence poured into the distilled water, the flask violently shaken and further drops of normal soda solution added until slight alkalinity is produced and emulsification complete. A drop should be examined by the microscope and large globules filtered off if present. The emulsion should then be sterilised at 110° C. and kept in sealed tubes. This emulsion has been used intravenously in 2 cases with good results; nodules have disappeared, sensibility was restored. After each injection congestion of the nodules and temporary pain have occurred indicating a selective effect on the leprous lesions. In 1911 Dr. Noc and the author had observed changes *in vitro* in the lepra bacilli which, after contact with the emulsion, lost in part their acid resisting property.

P. S. A.

Coghill (H. Sinclair). **Some Results obtained by Heiser's Treatment of Leprosy in Nigeria.**—*Ann. Trop. Med. & Parasit.* 1917. Aug. 23. Vol. 11. No. 2. pp. 205–210. With 2 plates.

This paper is a preliminary record of the results of treatment by Heiser's method in a number of cases of nodular and nerve leprosy at the Yaba Leper Asylum, Nigeria. The treatment was begun in May 1916 and continued until the following December. As the author observes, the time is too short for a complete report. All the cases were old-standing, and some had been in the Asylum for 11 or 12 years. They all responded more or less to the treatment: ulcers healing, nodules softening and becoming absorbed, maculae fading, and sensation returning. The details of 7 cases are given. The initial intramuscular dose was 2 cc. increasing by 1 cc. until finally 6 cc. were injected twice a week and well tolerated. Guaicol carbonate in 5 grain doses was useful in controlling febrile disturbance.

P. S. A.

Sordelli (Alfred) & Fischer (Hermann). **Zur Frage der diagnostischen Serumreaktion bei Lepra.** [Diagnostic Serum Reactions in Leprosy.]—*Wien. Klin. Woch.* 1917. Oct. 4. Vol. 30. No. 40. pp. 1256–1258.

This is an account of serological experiments and observations for diagnosis in 81 cases of tuberous leprosy carried out in Dr. Kraus's Institute in Buenos Ayres. In 43 cases the Wassermann reaction was strongly positive, in 25 negative, in 12 positive and 1 neutral. The Klinger-Hirsch and tuberculin reactions were also employed, and the results tabulated.

A positive "Wassermann," negative "Klinger-Hirsch" and positive "tuberculin" indicate leprosy: a positive Wassermann, positive Klinger-Hirsch and negative tuberculin indicate syphilis; and a positive result with all these reactions indicates leprosy combined with syphilis.

P. S. A.

Czaplewski. **Albert Neisser und die Entdeckung des Leprabazillus.** [Neisser and the Discovery of the Leprosy Bacillus.]—*Arch. Dermat. u. Syph.* Orig. 1917. Sept. Vol. 124. No. 3. pp. 513–530.

In 1879 Dr. Albert Neisser visited Norway in company with

Dr. LESSER for the purpose of studying leprosy. They were well received by Drs. DANIELSON and ARMANER-HANSEN, shown everything at Bergen, Molde and Trondhjem, and allowed to take away abundant material for microscopical examination.

The author claims that NEISSER was the real discoverer of the bacillus, and that he always felt aggrieved that his original work in this connection had not been generally recognised. It is quite true that shortly after his return from Norway he lectured on the aetiology of leprosy, and his paper was published in the "*Breslauer Arztlicher Zeitschrift*, 1879, Oct. 25 & Nov. 7." He therein recorded his elaborate observations on the bacilli, which he was the first to demonstrate by Weigart's staining methods—finding that they stained best with fuchsine and gentian violet. He proved their extraordinary abundance in the skin lesions and their presence in many of the internal organs, clearly described their morphological character, their formation in 'globi,' and expressed his belief in their etiological significance—that the bacilli were the real cause of the disease. In this paper NEISSER alludes to the earlier observations by HANSEN and others, and as far as the reviewer can gather only claimed to have surely demonstrated by staining their constant existence in leprous tissues and their importance as an etiological factor. It is noteworthy that these observations were made and published before Robert KOCH discovered and showed how to stain the bacillus of the tubercle.

Until NEISSER's work on the subject, the bacilli had certainly not been completely demonstrated, but there is no doubt that HANSEN many years previously and before the staining methods were known had observed the typical microorganisms, and published his observations in Norwegian, in the *Norsk Mag. f. Laegevidenskaben,* Kristiania, 1874. In 1880, HANSEN further published in *Virchow's Archiv*, Bd. 79, a full account of his work and former observations and experiments with drawings of the bacillus. HANSEN, indeed, is universally, and in the reviewer's opinion, rightly considered to be the original discoverer of the bacillus of leprosy.

The author of the paper under review maintains that HANSEN has got the credit in consequence of the greater publicity of his paper in *Virchow's Archiv*, and that NEISSER's work has been ignored. This is not quite correct: in the reviewer's article on leprosy in *Allbutt's System of Medicine*, 1st Ed., 1897, it is stated that "Neisser—employing the new aniline dyes, placed Hansen's discovery beyond doubt." NEISSER's important work in connection with leprosy, &c. was recognised by his being the recipient of the Gold Medal of the West London Medico-Chirurgical Society in 1911.

This paper is a characteristic German attempt to claim for Germany every important discovery in Science!

P. S. A.

TUBERCULOSIS IN NATIVE RACES.

WANLESS (W. J.). **Tuberculosis in India. Some Suggestions on its Spread and Prevention.**—*Proc. Third All-India Sanit. Conference.* 1914. Vol. 3. Supplement to *Indian Jl. Med. Res.* pp. 38–41.

The author, who is President of the Medical Missionary Association of India, expresses the opinion that there has been of recent years an increase in the amount of tuberculosis in India. He says:—

"The famine of 1900 and the plague outbreaks of previous and subsequent years have left in their train a legacy of tuberculous diseases. In times of scarcity and famine, and in recent years, during outbreaks of plague in villages, large numbers of the labouring classes have been in the habit of migrating to Bombay in search of employment and immunity from plague. No inconsiderable number of these people, contracting tuberculosis in the overcrowded *chawls* of Bombay, have returned to their villages to spread the disease among their families and neighbours. Again and again the writer has come across such cases. The Christian cemetery at Miraj is largely populated by persons dying of tuberculosis, a large proportion of whom were children, students or teachers in Bombay schools sent there from the Deccan during the last famine, and others who had gone to Bombay in search of employment.

"That persons born and matured in the Deccan lose resistance against tuberculosis through residence in Bombay seems to be supported by experience. The possible greater infectivity of Bombay as compared with the Deccan would not entirely account for this increased development of tuberculosis. Most of these patients referred to were students or teachers who lived in better sanitary surroundings and had better food and care than they had previously been accustomed to in their up-country homes. Add to this lowered resistance induced by the Bombay climate, the unsanitary conditions of the *chawls* and boarding-places, it is not surprising then that Bombay has had unmistakeable influence in the spread of tuberculosis among the up-country villages, and the same statement can probably be made in reference to other overcrowded coast cities."

A series of recommendations is then put forward with the prevention of tuberculosis in view, of which the principal are—(1). The printing of tracts in the vernacular setting forth the nature of and means of combating tuberculosis. (2). Special training of assistant and sub-assistant surgeons in giving instruction as to the disease to school-teachers. (3). A requirement that all such assistant and sub-assistant surgeons should be competent to diagnose tubercle bacilli by the microscope, with provision of the necessary apparatus. (4). Periodical examination of all school-children suffering from cough. (5). More sanatoria. (6). A large central fund to be raised with this object in view, to which it is thought that rich natives would be very willing to contribute.

J. B. Nias.

COCHRANE (A. W. R.) & SPRAWSON (C. A.). i. **The Organization of Anti-Tuberculosis Measures in India.**—*Proc. Third All-India Sanit. Conference.* 1914. Vol. 3. Supplement to *Indian Jl. Med. Res.* pp. 42–50. With 3 text-figs.

ii. **Experience in Treatment of Pulmonary Tuberculosis in Indians by Tuberculin.**—*Ibid.* pp. 51–60.

Two brief papers expressing the opinions of the authors on the subjects indicated in the titles. The recommendations as to an anti-tuberculosis campaign in India are on much the usual lines. The

importance of establishing tuberculosis dispensaries on an independent footing, after the Edinburgh model, is duly insisted on. The Tuberculosis Officer should occupy a relatively independent position with regard to the Medical Officer of Health, i.e., both should be separately responsible to a higher authority, while co-operating as regards their duties. The native habit with regard to expectoration, both in- and out-of-doors, should be effectively reformed. All school children should be inspected once a quarter at school for suspected phthisis, enlarged glands, bad teeth and so on, and the best person for such a task will be a nurse from the Tuberculosis Hospital, generally a European, whose pay should be not less than Rs.150 per month, with carriage hire. Like most other Indian observers, the authors remark that tuberculosis in India is more often propagated inside the native house than out of it.

The experience of the authors with tuberculin is limited to the small number of 55 cases in a sanatorium and 53 at a tuberculosis dispensary.

J. B. N.

WILKINSON (E.). **Notes on the Prevalence of Tuberculosis in India.**—*Proc. Roy. Soc. Med.* (Sect. Epidem. & State Med.). 1914. June. Vol. 7. No. 8. pp. 195–226.

In a paper read before the Section of Epidemiology and State Medicine of the Royal Society of Medicine, London, the author draws attention to the amount of tuberculosis in British India, as attested by recent observers. Satisfactory statistical returns for this purpose are difficult to obtain, because certification of the causes of death is impossible for the vast majority of the population, who either die without any medical attendance at all, or are attended by "practitioners of indigenous systems of medicine," as the author politely describes them. In the principal cities. however, during the last few years, enquiries have been instituted as to the causes of death by qualified medical men, and from these sources some reliable figures can be obtained as to the prevalence of tuberculosis amongst the general population. The following abridged table shows the proportion of deaths from phthisis during the last few years in the three great cities of Madras, Calcutta and Bombay.

Year.	Madras.		Calcutta.		Bombay.	
	Mortality per 1,000.		Mortality per 1,000.		Mortality per 1,000.	
	Phthisis.	All causes.	Phthisis.	All causes.	Phthisis.	All causes.
1905	1·6	24·2	2·4	38·0	3·27	61·54
1906	1·4	46·6	2·6	35·7	3·64	54·07
1907	1·2	40·5	2·6	37·6	2·94	39·56
1908	1·4	43·7	2·5	32·6	2·44	39·13
1909	1·2	37·9	2·3	34·1	2·45	35·66
1910	0·4	39·8	2·3	27·9	2·33	35·72
1911	0·4	42·0	2·3	27·2	2·12	35·69

Returns of deaths from the native army and the jails are vitiated by the invaliding of soldiers, and the liberation of prisoners, before death occurs. Returns from hospital and dispensaries are also vitiated from the varying qualifications of the native medical practitioners employed. A table (Statement III, p. 202) is given showing the hospital admission-rates of prisoners in jails, for tubercle of the lungs, in certain provinces of India, Burmah, and the Andamans, which exhibits an average, for the years between 1899 and 1911, ranging from 7·6 to 9·9 per 1,000. Whether there has been an actual increase in the prevalence of tuberculosis in India of recent years, or whether the increase is only apparent, due to the increased attention paid to the subject, is a question much discussed in India at the present time. The author suggests the following causes for a real increase.

1. The seasonal employment of country people in cotton and jute-mills and factories, with a subsequent return to the country.
2. Increased travelling of natives by train, with the habit of expectoration freely practised everywhere.
3. The extension of education and consequent multiplication of sedentary employments.

Attention has been paid of late to the question of bovine tuberculosis in India, but it has been found that on the whole bovine tuberculosis is decidedly rare in India among animals, and therefore it may be assumed that there is correspondingly little risk of this kind of infection in human beings. The danger is further diminished by the facts that large sections of the population, including all Hindus, refuse to eat beef, and that milk is almost invariably boiled before use; butter also being clarified by heating.

J. B. N.

LANKESTER (A.). **The Gland Index in Tuberculosis.**—*Indian Jl. Med. Res.* 1916. Oct. Vol. 4. No. 2. pp. 285–302.

The author of this paper discusses the question whether the gland index, i.e., palpation of the submaxillary and cervical glands in children, can be taken as a guide to the prevalence of tuberculosis in a community. Out of 9,128 school-children in India and Burmah, under 12 years of age, 2,692 or 29·49 per cent. showed enlargement of the glands, when examined as follows:—

"The method employed in the enquiry was of the simplest description, the aim being rather to cover a large and inclusive area than to deal in a more intensive manner with a limited field. . . . No prolonged examination of individual cases was made; the children were placed in lines and examined in succession by the two hands, one on each side of the neck. The submaxillary and cervical regions alone were palpated, and all cases were marked as negative in which enlargement of the lymphatic glands was not instantly apparent. . . .

"It is not, however, suggested that all, or even the great majority, of the cases classed as positive are necessarily tubercular in character; the contention is that the proportion of such cases is sufficiently large as to give practical value to the percentage as an index of tuberculosis prevalence."

The above figure of 29·49 per cent. is compared with that obtained from 240,000 children belonging to the London School Board, examined in 1913, in whom the percentage was 10·5, while in 1914 it was 8·8. The correlation between the gland enlargement percentages and the

tuberculosis death-rate in those centres where the figures for the latter were obtainable, was worked out for the author by Dr. T. G. WALKER, and the co-efficient obtained was ·91 ± ·03.

J. B. N.

i. DE LANGEN (C. D.) & SCHUT (J.).—**Essays on Tuberculosis in Java.** [Also in Dutch.]—*Med. Burgerlijken Geneesk. d. in Nederl-Indië.* 1917. Vol. 2. pp. 1–2.

ii. SCHUT (J.). **Immunity and Disposition for Tuberculosis among Savage Tribes and the Theory of the Virgin Soil.**—*Ibid.* pp. 3–29.

i. An introduction to a series of essays on tuberculosis in Java, of which the following is the first.

ii. The author discusses in general terms the asserted fatality of tuberculosis amongst the native races of the tropics, and is inclined to deny it. He regards von Pirquet's reaction as quite untrustworthy as an index of the presence of the disease in tropical races, and quotes authority for the statement. The greater part of the paper is devoted to controverting MUCH's hypothesis, that tuberculosis has become milder among Europeans and other inhabitants of the temperate zones, as the result of secular infection.

J. B. N.

PARROT (L.). **Infection tuberculeuse dans le Hodna Oriental (Steppe Constantinois).**—*Bull Soc. Path. Exot.* 1917. Dec. Vol. 10. No. 10. pp. 860–863.

The author gives figures for the percentage of Arab and Berber children from 0–15 years of age, infected with tuberculosis, as determined by the cuti-reaction test, in the above district, for the year 1915–16, as follows—

Arab children in villages.

0–1 year ..	.. 0 per cent.	39·6 per cent.
1–5 years ..	.. 16·7 „ „	
6–15 „ ..	.. 54·8 „ „	

Ditto living in tents.

0–1 year ..	.. 0 per cent.	30·5 per cent.
1–5 years ..	.. 20·8 „ „	
6–15 „ ..	.. 37·1 „ „	

Berber children in villages.

0–1 year ..	.. 0 per cent.	25·6 per cent.
1–5 years	.. 11·9 „ „	
6–15 „	.. 48·2 „ „	

Ditto in tents.

0–1 year ..	.. 0 per cent.	24·3 per cent.
1–5 years	.. 15·3 „ „	
6–15 „	.. 31·3 „ „	

J. B. N.

LOISELET (M.). **La tuberculose humaine à Madagascar.**—*Rev. Méd. d'Hyg. Trop.* 1913. Vol. 10. pp. 193–201.

The author comments on the facility with which cases of tuberculosis are cured in Madagascar. This appears to be due to the mildness of the local strain of tubercle bacillus. Pulmonary excavation is seldom met with in cases of phthisis, and the bacillus, under the microscope, shows granular attenuated forms which to the expert eye easily differentiate it from the European variety. Injected into guinea-pigs, even into the peritoneum, the bacillus, instead of causing death within the usual interval, allows of a long and even indefinite survival. The artificial cultures are poor, even after 5 or 6 weeks. Treatment of cases with tuberculin is generally successful, and can be pushed with extraordinary rapidity, whatever the form of the disease. This attenuation seems to be a property of the local strain of tubercle bacillus, because it is equally benign both for the native and the European. Infection with the European bacillus, on the other hand, hits the native badly.

Notes are given of the cases of 10 patients, some Europeans and the rest natives, affected with phthisis, in which treatment with injections of creosoted oil (1 : 15), and Denys' tuberculin produced striking results.

J. B. N.

BARBOSA (Placido). **O problema da tuberculose na cidade do Rio de Janeiro.** [The Problem of Tuberculosis in the City of Rio de Janeiro.]—*Brazil Medico.* 1917. July 28. Aug. 4 & 11. Vol. 31. Nos. 30, 31 & 32. pp. 251–253; 261–263; 269–271.

The author draws a dark picture of the state of the city and district of Rio de Janeiro as regards the prevalence of tuberculosis. The mortality is higher than that of 30 other large cities of the world which are named. Between 1863 and 1891, the mortality from tuberculosis declined from 12·2 to 5·4 per 1,000, but since that date it has remained comparatively stationary, the figures for the whole Federal District in 1915 being 4·61 per 1,000. In the city of Rio de Janeiro alone 3,500 persons die annually from tuberculosis, and it may therefore be estimated that from 8 to 10 times as many persons are suffering from that disease, according to the usual methods of calculation.

The author recommends a practical enforcement of all the usual precautions against tubercular infection which are found necessary elsewhere, namely, prohibition of expectoration in public places, notification, removal to hospital, domiciliary visiting, and improved housing of the working classes.

J. B. N.

LEGER (Marcel). **La Tuberculose à la Guyane française.**—*Bull. Soc. Path. Exot.* 1917. Nov. Vol. 10. No. 9. pp. 778–784.

The author finds that tuberculosis is taking a preponderating place in the nosology of French Guiana. Satisfactory statistics for the whole population are not to be had, as a very large number of deaths are uncertified as to cause. From the civil hospitals and the convict

establishments, however, some information is to be gained, and it is of a disquieting character. The following figures are taken from a table given (Table I).

Hospital cases, exclusive of prisoners.

	Total number of deaths from all causes.	Deaths from tuberculosis.
1898–1902	65 ..	8 = 12 per cent.
1903–1907	48 ..	3 = 6·4 „ „
1908–1912	53 ..	1 = 2·0 „ „
1913–1917 (8 mos.)	49 ..	7 = 14 „ „

The number of cases of tuberculosis admitted to hospital from the penal establishments for the last 8 years was as follows :—

1909	27	1913	36
1910	17	1914	57
1911	32	1915	39
1912	34	1916	40

In the Cayenne Civil Hospital tuberculosis heads the list of causes of death.

J. B. N.

SLOAN (Martin F.). **The Urgent Need of Hospital Facilities for Tuberculous Negroes.**—*Southern Med. Jl.* 1917. Aug. Vol. 10. No. 8. pp. 654–657.

According to the author, negroes form 29·8 per cent. of the population of the Southern United States, and are three times as much affected by tuberculosis as whites. Nevertheless, out of 4,130 beds in different sanatoria, only 114, or 3 per cent., are alloted to negroes. The number of negroes suffering from tuberculosis is probably much greater than that officially registered, and practically all who die, die at their homes, so as to infect the maximum number of contacts. The Federal Census of 1910 showed 9,827,763 negroes in the United States, of whom 8,746,709, or 89 per cent., were in the Southern States. In numerous trades and domestic occupations the negro comes into the closest contact with the white man; therefore manifestly there is here a very urgent problem to be solved from every point of view. The prejudices of the negro make it very difficult to get him into a sanatorium, and when there, care must be taken to interest and to occupy him. Also, every effort should be made to instruct such patients in the hygiene appertaining to tuberculosis. The stay in the sanatorium should be for at least 6 months. In the discussion which followed, in which several medical experts took part, the necessity for home-visiting, in addition to sanatorium treatment, was strongly insisted on.

J. B. N.

PROTOZOOLOGY.

FANTHAM (H. B.). **Some Parasitic Protozoa of Man, and their Probable Evolution.**—*Med. Jl. S. Africa.* 1917. Oct. Vol. 13. No. 3. pp. 33–48. With 37 text-figs.

In this paper Fantham gives a general account of most of the Protozoa which are of special interest to those engaged in the practice of medicine. It is a clear account and has sufficient detail to render it of practical value. Considerable stress is laid on the process of adaptation to a parasitic life in man of the protozoal forms which exist either free in nature or already parasitic in lower animals. More space is devoted to the Mastigophora than to the other classes of the Protozoa; a section is devoted to the spirochaetes. In the course of his paper the author draws attention with particular emphasis to that aspect of his subject which is of the greatest interest to medical men, namely the view that a proper and efficient prophylaxis against protozoal disease can be established only when, by a thorough study of the life history of the various protozoa, their habits, localities and means of transmission are understood and appreciated. The paper does not contain much that is new, but it is up to date and for those who are beginning the study of the pathogenic protozoa it will afford a useful insight into the subject.

B. Blacklock.

KUENEN (W. A.) & SWELLENGREBEL (N. H.). **Korte beschrijving van enkele minder bekende protozoën uit den menschelijken darm.** [Short Account of Some Less Known Protozoa from the Human Intestine.]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1917. Vol. 57. No. 4. pp. 496–506. With 1 plate.

Under the name *Entamoeba tenuis* the authors give a description of what they consider to be a new species. It measures 6–9μ in diameter with cysts 6–8μ in diameter. The cysts are one to four nucleated; none with a larger number than four nuclei was found. In a footnote the authors say it is possibly the *E. minuta* of WOODCOCK and PENFOLD, but state that this latter name is already taken as a synonym of *E. histolytica.*

Chilomastix mesnili is described in the next section and in reference to its cysts attention is drawn to the resemblance between some of these and the cysts of *E. tenuis.* Limax amoebae were found and are classified under three types, *Limax*, *Endolimax intestinalis* and *Pseudolimax.* A section on Blastocystis concludes the paper. Of Blastocystis the authors say it is a product of necrobiosis in certain cells but what cells, whether epithelial or parasite or both, they do not debate here.

B. B.

LEGER (Marcel). **Parasites sanguicoles d'Oiseaux de la Guyane.**—*Bull. Soc. Path. Exot.* 1918. Feb. Vol. 11. No. 2. pp. 124–130.

The author compares the incidence of Haematozoa in birds in Tonkin, French Sudan, France and Guiana. He has failed to find

Leucocytozoa in birds in the last named region although he has examined more than 500 specimens belonging to 78 different species and 27 families; he gives a list of the families. The negative results obtained by BRIMONT in the same region, by CARINI and collaborators in Brazil and ITURBE and GONZALES in Venezuela are mentioned. The parasites found in the blood of the birds examined are described under four headings:—Trypanosomes, Haemoproteus, Microfilaria and Spirochaetes.

In *Nyctanassa violacea*, a bird of the family Ardeidae, a trypanosome was found in 6 out of 10 individuals. It is the same trypanosome as that found in Tonkin by MATHIS and LEGER in *Ardetta Sinensis*, and as that found in *Ardea atricapilla* in Senegal by A. and M. LEGER. This trypanosome is found therefore in Asia, Africa and America in species of the same family. The author proposes on this account to call it *Trypanosoma ardeae*. He gives a description of this parasite, and of similar ones found in *Ardea caerulescens* and *Batorides striata*. Under the heading Haemoproteus he gives the following hosts, *Falco sparverius*, *Anas moschata*, *Tringa atricapilla*, domestic pigeon, *Columba rufina* and *Scops brasiliana*.

Spirochaeta gallinarum was found in fowls, and was the cause of considerable mortality. *Argas miniatus* was present in most of the fowl houses in large numbers.

B. B.

COMMES (Ch.). **Leucocytozoon et Microfilaire d'un rapace diurne (*Astur badius*, var. *sphenurus*).**—*Bull. Soc. Path. Exot.* 1918. Jan. Vol. 11. No. 1. pp. 31–34.

The author found in the blood of this bird at Bamako a leucocytozoon and a microfilaria of which he gives a short description. Microgametes and macrogametes of the leucocytozoon appeared in the peripheral blood, the former measuring 21 by 5·5μ, the latter 23 by 7μ. Lung smears revealed the young forms of the parasite in large numbers and here all forms stained better than those found in the peripheral blood. The leucocytozoon corresponds to type F of the classification of MATHIS and LEGER. Efforts at producing infection by inoculation were negative. The author names it *L. Martyi*. The microfilaria, which was unsheathed, measured about 90μ long by 4·2μ broad. No adult filariae were found at autopsy. The name given to it is *Microfilaria bernardi*.

B. B.

JOHNSTON (J. E. L.). **On some Peculiar Bodies found in the Blood of Certain African Snakes.**—*Jl. Trop. Med. & Hyg.* 1917. Nov. 1. Vol. 20. No. 21. pp. 241–242. With 2 plates.

In the heart blood of seven out of twenty snakes examined in Nigeria bodies were found in the erythrocytes. The cells concerned stain poorly, the changes affecting the nucleus and being apparently of a degenerative character. The bodies, the parasitic nature of which is considered probable by the author, although he considers it not definitely proved, are small and of two kinds, one of which stains blue and the other red. They exhibit considerable variation in size.

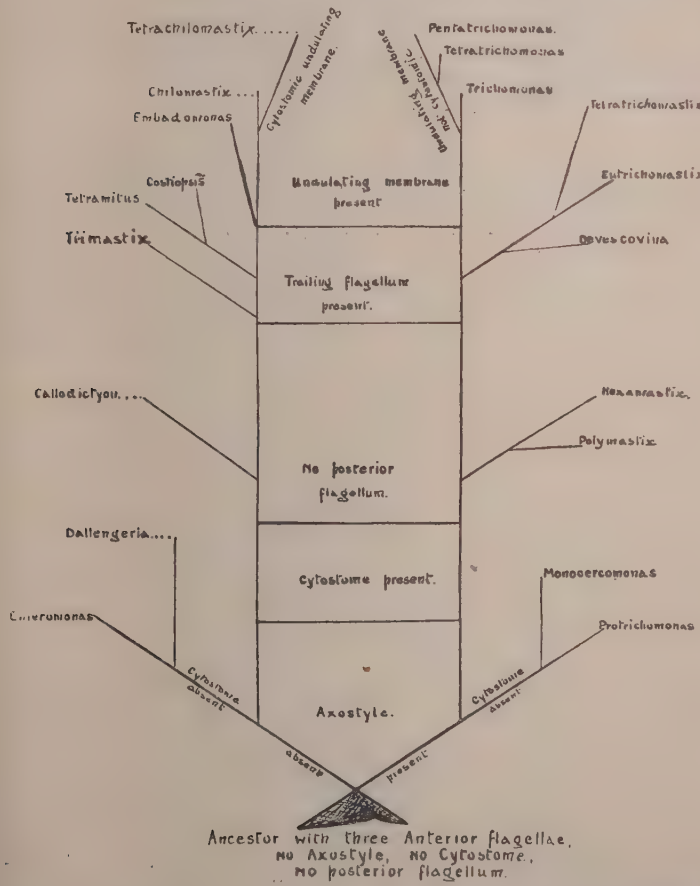
The author suggests they may be a new parasite, or a stage in the development of a parasite already known, such as a haemogregarine.

B. B.

CHALMERS (Albert J.) & PEKKOLA (Wäinö). *Chilomastix mesnili* (Wenyon 1910).—*Ann. Trop. Med. & Parasit.* 1918. Jan. 31. Vol. 11. No. 3. pp. 213–264. With 2 plates.

This paper should prove of great value to those who are engaged in the study of members of the family Tetramitidae. The authors' somewhat apologetic reference to the limited resources in literature to which they had access seems hardly necessary in view of the great amount of work they have accomplished.

Possible Affinities of the Genera of the Tetramitidae.



[Reproduced by permission from the *Transactions of the Society of Tropical Medicine and Hygiene.* 1917. Dec. Vol. 11. No. 2. p. 101 (where this diagram was published on a reduced scale)]

The genus *Chilomastix* Alexeieff 1911 is dealt with historically and the species *C. mesnili* Wenyon is traced in the literature so far back as DAVAINE'S *Traité des Entozoaires* published in 1860, in which in the authors' opinion it appears as one of two varieties of *Cercomonas hominis.* The authors give a very full account of the work of WENYON on this parasite and of the various synonyms. The geographical and zoological distribution are briefly stated and the authors go on to give a description of the living parasite, its morphology and development.

In their section on Classification the authors give diagnostic tables of the Mastigophora, Euflagellata, Protomonadina, and Monozoa, and the consideration of the family Tetramitidae follows, in he course of which the authors give a brief account of each of thirty-four genera. Of these they discard all but nineteen which they define.

The sections which follow are concerned with affinities, subfamilies, the Tetramitidinae, the genus *Chilomastix* and *Chilomastix* species, and *Chilomastix mesnili*, its pathogenicity, and treatment. The paper is illustrated by photomicrographs. A diagram illustrating the authors' views of the possible phylogenetic relationship of the genera is reproduced here, and may be used also in connection with their paper on Enteromonas [see below].

B. B.

SWELLENGREBEL (N. H.). **Ueber die Cystenbildung des** *Chilomastix mesnili* **Wenyon.** [Cyst Formation of *C. mesnili.*]—*Arch. f. Protistenk.* 1917. Vol. 38. No. 1. pp. 89–93. With 2 plates & 1 text-fig.

The author studied three cases of infection with *C. mesnili* at one time and two others subsequently. From the varied appearance of the organisms in the cases, he considers it possible that such subgenera as Fanapepea and Difaemus may have little validity.

The process of encystment has not, in the author's opinion, as yet been completely described and he proceeds to describe it. Case number one was a pure infection with *C. mesnili.* He found pear shaped forms, oval forms and small round forms, the latter provided with a definite cyst wall. Case two had also infection with *E. histolytica* and Blastocystis. The rounding of the parasites was repeatedly observed in this case, the resulting form being devoid of flagella and having alveolar protoplasm. Cyst forms containing one nucleus and two nuclei were found ; finally also four-nucleate forms with chromidial bars. The author states that he could not determine with the material from this case whether these last forms belonged to *C. mesnili.* Case three had a mixed infection with *E. coli* and *Amoeba limax.* One two and four nucleated cysts were found with and without chromidial bars. The author observed that these forms corresponded with the forms from case two. He states " These four nucleated cysts show a superficial resemblance to cysts of *E. histolytica,* but are much smaller." [How much not stated.] Case four had active forms in the stool and the earliest stages of encystment could be followed because in this case the non-flagellated precystic stage was absent. He represents in a text figure a form of which he says " First of all there are in the cyst the three flagella, 3 basal granules, and the peristome fibril quite clear."

B. B.

ARAGÃO (Henrique de Beaurepaire). **Pesquizas sobre o *Copromastix prowazeki* n.g., n.sp.** [Researches on *Copromastix prowazeki* n.g., n. sp.]—*Mem. Inst. Oswaldo Cruz.* 1916. Vol. 8. No. 2. pp. 64–67. With 1 plate.

The author describes the flagellate, which developed in faeces culture on two occasions. The first was on a medium composed of ·5 per cent. egg albumin, which was used for the culture of Nyctotherus in frog faeces, the second was in Ancylostoma faeces diluted, to which animal charcoal had been added. He discusses the question of parasitism in these cases and considers it probable that the organism is a free living form which was enabled to pass through the alimentary tract in an encysted condition.

The length averages 16 to 18μ and the breadth 7–9μ in fully developed forms. Smaller forms were 6μ by 3μ. The form of the body is elongated being broad in front and tapering posteriorly. The anterior border forms the base of the isosceles triangle to which the body of the protozoon is comparable. At one of the antero-lateral angles there is a buccal groove which extends to a third of the anterior border and a quarter of the lateral border. The mouth is a simple slit without any special organ. Four anterior equal flagella rise in a basal granule from the middle of the anterior border; a rhizostile is frequently seen running from the basal granules into the protoplasm, running near the nucleus. The author does not think this organism can be included in known genera and he creates the genus Copromastix with the name *C. prowazeki.* The diagnosis of the genus is Tetramitidae, with 4 equal and anterior flagella, with subtriangular body, with buccal groove, not provided with any organelle; not possessing either undulating membrane or axostyle.

B. B.

CHALMERS (Albert J.) & PEKKOLA (Wäinö). *Enteromonas hominis* **da Fonseca, 1915.**—*Trans. Soc. Trop. Med. & Hyg.* 1917. Dec. Vol. 11. No. 2. pp. 93–103. With 1 plate.

After introductory matter the authors go on to consider Da Fonseca's original definition of the genus Enteromonas and his description of the species *E. hominis.* The authors have discovered this parasite in Khartoum in a woman usually resident near Assouan. The symptoms in this case were alternating periods of diarrhoea and constipation. No blood was passed but pain and straining occurred. The motions were about six daily during the attacks which generally lasted ten to fifteen days. The flagellates were present at all times during the period of observation, but were scanty except during the diarrhoea period when they occurred in enormous numbers. A description of the parasite in the living state and when fixed and stained is given. Points in the morphology are the following. The parasite has three types, oval, rounded and irregular, which vary in size from 5·5 by 4μ for the oval form, to 4 to 4·5 for the rounded, while some forms reach about 6μ in length. Three flagella are present two of which are of more or less equal length, the other longer, sometimes 7μ long. The direction of the flagella varies but is generally forward; the authors did not find that any of the flagella was a trailing flagellum. The

flagella originate from two blepharoplasts the one which lies anteriorly giving rise to the two equal flagella, the posterior to the long flagellum. The nucleus about 1μ in diameter lies behind and near the blepharoplasts. No cytostome, axostyle or undulating membrane was seen. Sections on development and classification follow [see above]. No pathogenic bacteria were found on culture and the symptoms are attributed to the flagellate.

B. B.

Brug (S. L.). **Trichomonascysten.**—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1917. Vol. 57. No. 3. pp. 347–356. With 1 plate.

The author gives a historical account of previous records of the finding of Trichomonas cysts, and discusses the evidence for and against the various records. He himself has studied Trichomonas in guinea-pig and rat gut, staining with Heidenhain's iron haematoxylin. A pure infection of Trichomonas was not obtained, there being always other protozoa present. He gives a description of the characters of Trichomonas as found in the active state in the caecum, and proceeds then to show that lower down in the gut these forms are replaced by inactive encysted forms. He bases his argument on the detection in the cyst forms, of important characters which belong to the free form. Inside the cyst wall he finds persisting the marginal filament of the undulating membrane, the basal fibril, the nucleus with distinct caryosome and the granules along the basal fibril. Preparations must be so strongly differentiated that the undulating membrane filament and the basal fibril become indistinct if one wishes to study the nucleus. Evidences of nuclear division in the cysts was found. Axostyle and free flagella were not seen in the cysts.

B. B.

i. Martoglio (F.). **Su di un nuovo genere di parassiti del sangue.**—*Ann. d'Igiene.* 1917. Sept. 30. Vol. 27. No. 9. pp. 561–563. With 1 plate.

ii. Lanfranchi (A.). **Su di un nuovo genere di parassiti del sangue.**—*Ibid.* Nov. 30. No. 11. pp. 697–699. With 4 text-figs.

i. While studying the occurrence of spirochaetes in fowls in Eritrea, the author made the following observation. A fowl was infected experimentally with Spiroschaudinnia on the 25th March 1915. In twenty-four hours a few parasites were visible in its blood, on the 27th they had increased in number, on the 28th they were very numerous and commencing to agglutinate and on the 29th they were agglutinated in masses; on the 30th and 31st negative. On April 3rd flagellates were seen in the blood and they increased in number on the 4th and 5th; on the 6th they were rare; the fowl died on the evening of the 6th. Organ smears presented small numbers of the parasite. In stained preparations no trace of cytostome could be seen; the size being 8·5μ to 10·5μ by 10·5μ to 12μ. The trophonucleus measured 2·4μ to 2·8μ by 3·2μ to 4·8μ, oval in shape and placed somewhat laterally, and the kinetonucleus, elongated in shape, 0·8μ to 1μ by 1μ to 1·6μ. Four flagella free in all their length, 10 to 15μ long, and one bordering an undulating membrane are present. Two axostyles originating in the region of the kinetonucleus traverse the body to fuse in the opposite extremity; sometimes they remain separated.

The author proposes the generic name and gives his diagnosis of the genus Haemotrichomonas for this organism. He refers to the organism described by PLIMMER from snakes' blood and applies to it the name *Haemotrichomonas ophidium* while the present parasite is called *H. gallinarum.*

ii. The author refers to the paper by MARTOGLIO and draws attention to the fact that he (the author) described and figured a pathogenic blood parasite of pigeons in 1908* which he placed in the Mastigophora. On reviewing this parasite in the light of MARTOGLIO's observations he considers it to correspond morphologically to Trichomonas. He accepts the genus *Haemotrichomonas* and adds to it this the third species.—" *Haemotrichomonas columbae* (F. Martoglio 1917) discovered by Lanfranchi (1908) in warm blooded animals, and capable of infecting rabbits and guinea-pigs." The author reproduces here some of his original figures.

B. B.

FRANÇA (Carlos). **Quelques observations sur les Triconymphidae.**—*Ann. Inst. Pasteur.* 1916. May. Vol. 30. No. 5. pp. 195 204.

The author considers that the descriptions of these parasites ordinarily given in text books are incomplete and give rise to much discussion. He cites the description of *Triconympha agilis* by BÜTSCHLI, which has been reproduced almost without modification in the most recent works on Protozoology, with the figure from LEIDY'S work. The figure which represents the parasite in the fresh state is incorrect. He proceeds to describe this parasite, which was first discovered by LEIDY in 1877 in *Termes flavipes.* He considers next the form which LEIDY figures as a young form of *Triconympha agilis*, and which has been referred to by BÜTSCHLI and DELAGE and HÉROUARD ; he thinks it is quite different from those hitherto described and founds a new genus, *Leidya*, for it, with the specific name *L. metchnikovi.* França gives the following classification :—

Ord. *Hypermastigina* Grassi and Foà (1911)

Forms usually very large, having numerous flagella disposed in a very variable manner.

This order comprises the families :—

I. *Calonymphidae* Grassi. Large forms with multiple nuclei. Each nucleus has a blepharoplast corresponding to it, from which one or several flagella proceed ; axial filaments.

This family contains the genera :

A. *Calonympha* Foà (1905)
   C. grassii Foà, parasite of Termites in Chili.
B. *Stephanonympha* Janicki (1911)
   S. silvestrii Janicki (1911)

II. *Lophomonadidae* Grassi (1911) Large forms with a single nucleus. Axial rod enveloping in its anterior point the nucleus. Basal apparatus well developed.

This family includes the genera :

C. *Lophomonas* Stein (1860)
   L. blattarum Stein (1860) parasite of *Periplaneta orientalis.*
D. *Joenia* Grassi (1885).
   J. annectens Grassi (1885), parasite of *Calotermes flavicollis.*

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* LANFRANCHI. Di una speciale forma morbosa nei piccioni dovuta ad un emotozoario della famiglia dei mastigofori. *Moderno Zooiatro* 1908. Supplement to No. 6 p. 289.

III. *Triconymphidae* Leidy (1877). Large forms with a single nucleus. These forms do not possess an axial filament. Siderophile structure at the anterior extremity.

This family contains the genera:

E. *Triconympha* Leidy (1877)
T. agilis Leidy (1877) parasite of *Termes flavipes* (America) and of *T. lucifugus* (Europe).

F. *Gymnonympha* Dobell (1910)
G. zeylanica Dobell (1910) parasite of *Calotermes militaris*, Ceylon.

IV. *Holomastigidae* n. fam. Large forms with a single nucleus without axial rod. Flagella over the whole surface of the body. These flagella are inserted on one or more lines running straight or in spirals.

The family comprise the genera:

G. *Pseudotriconympha* Grassi and Foà (1911) male form or form A. of *Triconympha hertwigi* Hartmann.
P. hertwigi (Hartmann) parasite of *Captotermes hartmanni* (Holmgr.) Brazil.

H. *Holomastigotoides* Grassi and Foà (1911) female form or form B. of *T. hertwigi* Hartmann.
H. hertwigi (Hartmann) parasite of *Captotermes hartmanni*.

I. *Leidya* n.g.
L. metchnikovi, n.sp. parasite of *Termes lucifugus* of Portugal and probably of *T. flavipes* (America).

B. B.

DA FONSECA (Olympio Oliveira Ribeiro). **Sobre os flagellados parasitos.** —*Brazil Medico.* 1917. Sept. 8. & Dec. 8. Vol. 31. Nos. 36 & 49. pp. 305–306; 417; 1918. Jan. 26. Vol. 32. No. 4. p. 25.

i. The author discovered in a reptile of the genus *Amphisbena* two species of flagellate, one of which he considers to be *Octomitus dujardini* Dobell; the other is described in this paper, and is assigned to the genus *Trichomastix* Blochmann with the specific name *Trichomastix saurii*, n.sp. The parasite is elongated piriform in shape, and has a strong axostyle which projects a quarter of its length beyond the posterior end of the body; it is provided with a caryosome nucleus situated anteriorly, and four free flagella, of which one, much longer than the others, trails behind. Length of parasite 6–12μ, width 3–6μ, nucleus 2μ in diameter.

ii. The author gives the name *Waskia wenyoni* to a parasite which he discovered in Brazil in *Cebus caraya*. Differences in the forms of division exist which, the author considers, authorise his creating a new species of Waskia. [This *Bulletin*, Vol. 9, p. 408.]

iii. This is a brief paper in which the author gives the result of his examination of ten patients taken at random in the hospital at Bauru, State of S. Paulo. Of the ten examined two had intestinal flagellates; in each of these *Chilomastix mesnili* was present and in one an associated infection with *Enteromonas hominis* da Fonseca occurred. Reference is made to the paper of CHALMERS and PEKKOLA on this organism [this *Bulletin*, Vol. 11, p. 63]. None of the three flagella is constantly directed backwards; all are habitually directed forwards.

B. B.

RODHAIN (J.) & VAN DEN BRANDEN (F.). **Essais sur la pluralité des espèces flagellées parasitant le tube digestif des Invertébrés. Note préliminaire.**—*Bull. Soc. Path. Exot.* 1917. Nov. Vol. 10. No. 9. pp. 811–814.

By means of numerous experiments which consisted in feeding bred insects on flagellates from the intestine of insects of a different genus it was found that

(1) The Trypanosomidae of Pycnosoma do not adapt themselves to the intestine of the genus Stegomyia, nor of *Cimex rotundatus.*

(2) The Trypanosomidae of *Glossina palpalis* do not adapt themselves to the intestine of Stegomyia, nor of *Cimex rotundatus.*

The authors say the negative results of their experiments speak in favour of the plurality of the flagellate species which are parasites of the digestive tube of invertebrates.

B. B.

CHATTON (Édouard) & BLANC (Georges). **Notes et réflexions sur le toxoplasme et la toxoplasmose du Gondi** (*Toxoplasma gondii* **Ch. Nicolle et Manceaux 1909).**—*Arch. Inst. Pasteur de Tunis.* 1917. Oct. Vol. 10. No. 1–2. pp. 1–40. With 1 plate.

After a short account of the history of the observations on Toxoplasma the authors give the results of their own experience with the parasite as it effects gondis. They deal with the subject from many points of view and in a very complete manner. Curves giving the incidence of the infection according to the months of the year demonstrate that cold has a considerable influence, in captive animals at least, in determining increased seasonal mortality. Tables are given in which are enumerated the natural hosts of Toxoplasma and the results of experimental inoculation. Morphology is given in detail and a list of ectoparasites of the gondi with suggestions as to which may prove worthy of investigation as vectors.

The list of ectoparasites of the gondi in nature which is given is—*Rhipicephalus sanguineus, Hyalomma* ? sp., *Trombidium* sp., *Coenopsylla mira, Thersestes* (*Mycterotypus*) *laurae* Weiss, and *Simulium liniatum.* Of these the authors consider that in nature only the *Rhipicephalus* and *Trombidium* come under suspicion as vectors. In the laboratory *Rhipicephalus sanguineus, Dermanyssus, Ctenocephalus serraticeps* and *Cimex lectularius* should receive attention.

Next to the gondi the mouse is most easily infected by virus from gondis, but many small rodents are susceptible to intraperitoneal inoculation. The white rat is refractory. The rabbit is infected only by the intravenous mode. The cat is more susceptible than the dog.

B. B.

FRANÇA (Carlos). **Sur la classification des hémosporidies.**—Reprint from *Jl. Sciências Matemáticas, Fisicas e Naturais.* Ser. 3. No. 1. 41 pp. With 29 text-figs. 1917. Lisbon: Imprensa Nacional.

The author commences by stating "Dans la classification des Haemocytozoa ou Haemosporidia la plus grande confusion règne

encore, ce qui fait désirer une révision de leur classification." On the first page he refers to the "order" Haemosporidia and a few lines lower down says, "the Haemosporidia constitute one of the 'suborders' of the Sporozoa."

Some attention must be paid to the circumstances in which the family Haemamoebidae appears in the author's classification. The suborder Haemosporidia is stated on page 4 to comprise four families, viz., (1) Haemogregarinidae; (2) Plasmodidae; (3) Piroplasmidae; (4) Toxoplasmidae. On page 16, however, the second family is given thus without explanation: (2) Fam. Haemamoebidae, Ross 1899. Syn. Plasmodiidae, Lühe 1906.

Not content with altering the name of his second family of the *Haemosporidia*, França commences his definition of the Haemamoebidae, as he does prevously that of the Haemogregarinidae, with the word "Haematozoaires" without having defined the term Hématozoaires. There is, in fact, on the part of the author not only a constant ignoring of his own previous definitions but also a repeated introduction of undefined terms.

To illustrate another peculiarity of this classification, namely, the repetition of characters implicit in larger groups, we may take the author's description of two genera of the Haemogregarinidae, Haemogregarina and Hépatozoon.

Genus. Haemogregarina. "*Hématozoaires vermiculaires non pigmentés* habitant des hématies. *Schizogonie par des kistes dans les organes internes,*" etc.

Genus. Hepatozoon. "*Hematozoaires vermiculaires sans pigment* et habitant les leucocytes. *Schizogonie dans des kistes dans les organes internes,*" etc.

The italics are the reviewer's and are put here in order to draw attention to the fact that the italicised portions of these generic definitions have already been given as family characteristics. The family definition previously given is as follows:—(1) Fam. Haemogregarinidae. *Hématozoaires vermiculaires* habitant des hématies ou des leucocytes *et ne possédant jamais de pigment. Schizogonie à l'interieur de kistes dans les organes internes.*

Even more puzzling is the author's habit of interpolating suddenly and without any apparent principle a stray character. For example, among his characters of the genus Leucocytozoon, he states that they inhabit red cells and that their microgametes are flagelliform, facts which are not mentioned for any other of his genera of Haemamoebidae, and which should not, according to this classification, require to be mentioned, for the simple reason that his definition of the family Haemamoebidae states that they all inhabit red cells and have flagelliform microgametes. Similarly, it is mentioned that the Haemamoebidae have their sporogony cycle in the invertebrate: no mention is made of this fact as regards the families Haemogregarinidae, Piroplasmidae, and Toxoplasmidae. It is given, however, as a character of the suborder Haemosporidia and therefore should apply to all these families equally.

Apart from such defects as can be found in the substance of the classification, there are also formal defects which lead to confusion. Thus, under the family Piroplasmidae, we find genus f. Achromaticus and next to it genus f. Rangelia; word misprints are also found.

It has to be borne in mind that the criticism contained in this review has not touched the question whether the author's classification is justified or necessary. All that has been done is to assume that the author has made out his case that the description of this group of protozoa is in a state of confusion and then to accept and examine the classification, which is intended to rectify this confusion, on its own merits. It is unlikely that anyone who reads França's paper to the end will disagree with his statement quoted at the beginning of this review, but whether a perusal of it will greatly clarify the reader's ideas is extremely doubtful. França's simplification tends to be on the *lucus a non lucendo* principle. The author gives no indication as to the scale of his drawings.

B. B.

FRANÇA (Carlos). **Notes sur la biologie des Hémosporidies. La schizogonie des Hémogrégarines.**—*Bull. Soc. Path. Exot.* 1918. Mar. 8. Vol. 11. No. 3. pp. 171–173.

The author made experiments with a view to discovering the cause of a phenomenon which he had observed some years ago, namely the formation of cysts in the red blood cells of *Lacerta muralis* infected with *Haemogregarina bicapsulata.* This result was obtained in preparations sealed with paraffin and watched for several hours. The experiments carried out by França were as follows:—(1) The heart of infected *L. muralis* was removed after ligature of the vessels and kept in physiological saline; after three hours a large number of cysts with macro- and micromerozoites was found. (2) The liver after ligature of the vessels was kept for 2 to 3 days in physiological saline; the cysts were found in immense numbers. França considers that two factors enter into these experiments, namely immobilization of the infected blood in a non-coagulated state, and diminished oxygenation, the former being the more important. LAVERAN and PETTIT in 1909 recommended the following procedure for the study of the multiplication of hemogregarines. The viscera of an infected animal bled white were placed in the ice chest for 4–5 days, then ground up, and the pulp obtained shaken with salt solution and centrifuged. Preparations made from the deposit in the region of the red cell layer showed cysts even when they were rare and not to be found in ordinary smears. França considers that this procedure is successful because not only cysts existing at the time of death but newly formed cysts are present. He emphasizes the important effects which mechanical conditions may produce in the biological phenomena of protozoa. He has observed in the heart blood and in the vessels sporogony phases of certain Haemosporidia.

B. B.

KREMPF (A.). **Un hématozoaire endoglobulaire nouveau de l'homme (*Haemogregarina hominis*).**—*C. R. Acad. Sci.* 1917. June 18. p. 965.

The author found the parasite which he here describes in blood from spleen puncture in a Chinaman from Tien-Tsin, who had malaria and splenomegaly. No parasites were found in the blood except in

the spleen, but liver puncture was not permitted by the patient. Even in the spleen they were scanty. They occur in the form of vermicular and comma shaped sporonts enclosed in red cells, or free as the result of manipulation. The red cells infected are enlarged and distorted and enclose a capsule measuring 10μ by 5μ which contains the vermicular sporont folded once or twice on itself. Unequal division of the parasite takes place, one portion being U shaped and retaining its vermicular form, the other being comma shaped. In spite of difference of dimensions, these two portions have similar cytological structure. Each has a granular nucleus coloured dark red by eosin azur, and a deep blue protoplasm in which chromatoid masses of rounded or oval shape are present. The free forms do not differ from the encapsuled forms. The measurements of the largest extended parasite are 20μ by 1·5μ broad; the comma shaped sporonts measure 6 to 8μ by 1·5μ. No young forms nor schizogony forms were found. The author proposes the name *Haemogregarina hominis* for the parasite.

B. B.

D'Utra e Silva (Oscar) & Arantes (J. B.). **Sobre uma hemogregarina da gambá.** [A Haemogregarine of the Opossum, *Haemogregarina didelphydis* n. sp.]—*Mem. Inst. Oswaldo Cruz.* 1916. Vol. 8. No. 2. pp. 61–63. With 1 plate.

The authors found in the blood of a male adult opossum a haemogregarine to which they give the name *Haemogregarina didelphydis.* The infected animal was one of fifty examined from Merity. The parasite was found in the red cells. In fresh preparations made from the blood of the tail they appeared as hyaline, motionless bodies round or ovoid in shape having in the centre a rounded nucleus of greater refractiveness than the protoplasm. No pigment was seen; the parasites were rarely free in the plasma, part or whole of an erythrocyte being occupied by each as a rule. In fixed and stained preparations the measurements were, 8 to 10μ long by 4 to 6μ broad. Organ smears and sections were made. In the former scanty parasites were found, while sections of the pancreas showed cysts included in the cells of the acini and pushing the nucleus to one side. The parasite on entering the tissue cell grows at the expense of the cell protoplasm and displaces the cell nucleus. The nucleus of the parasite divides and give rise to the merozoites up to 18 in number. The cysts may attain a size of 22μ by 12μ. Opossums, rabbits, guinea-pigs and white rats were inoculated with blood and tissue fluids but no infection occurred.

B. B.

Escomel (E.). **Le *Phyllodactylus gerrhopygus* au Pérou. Son infection par une hémogrégarine.**—*Bull. Soc. Path. Exot.* 1917. Dec. Vol. 10. No. 10. pp. 873–879. With 1 fig.

Of 75 specimens of platydactyls—species *Phyllodactylus gerrhopygus*—examined, 3 were infected by a haemogregarine. The parasite did not appear pathogenic; it occurred intracellularly and free. A description of the forms seen is given. Laveran, who discussed the paper, referred to a cleft which Escomel described in the parasites.

This Laveran considers to be due to the folding of the pointed end of the parasite on itself. In such folded specimens the nucleus tends to lie near the wide anterior end of the parasite. He notes the fact that Escomel does not deal with multiplication forms and recommends especially liver smears for the purpose of studying such forms.

B. B.

CLARK (Herbert C.). **Bovine Piroplasmosis in Panama.—A Preliminary Report.**—*Proc. Med. Assoc. Isthmian Canal Zone.* 1916. July-Dec. Vol. 9. Pt. 2. pp. 116–121.

Several calves at Corozal Hospital farm died of a disease of which the cause was not discovered. The symptoms were emaciation and anaemia. Post mortem examination did not reveal anything. The animals were tick infested. On Nov. 22 1916 two calves which were moribund were killed and examined immediately. Smears from the organs were made and in those made from the brain *Babesia bigemina* was found in large numbers in the capillaries. In films from the peripheral blood and in other organs they were found with difficulty. The urine contained albumin but no red corpuscles nor haemoglobin. Similar results were obtained in two sick calves from near Miraflores. Twenty-five suspected animals were thereupon slaughtered and in each one the organism was discovered in the brain. There were five of these in which the parasite was present in small numbers. Of the cattle two were native cows, the others being mixed-bred calves the offspring of imported American cattle and native cattle. The two native cows were lightly infected and possibly carriers. The author points out the economic importance of the existence of this disease and makes recommendations with regard to its suppression. As to the local form of the disease, the absence of parasites in the peripheral blood, the absence of haemoglobinuria and the usual changes in the spleen, compel the author to regard it as a modified form. Ticks removed from animals examined were identified as *Margaropus annulatus.* The author promises further observations on the disease.

B. B.

STEFKO (W.). **Piroplasmose et Anaplasmose en Turquie (1916).**—*Bull. Soc. Path. Exot.* 1917. Oct. Vol. 10. No. 8. pp. 723–724.

Piroplasma bigeminum, P. annulatum and *Anaplasma centrale* were frequently found in oxen from Russia examined in Trebizond. The mortality was 80–90 per cent. The carrier is *Boophilus annulatus. Ixodes corniger* Kol. and *Rhipicephalus simus* Koch are less prevalent in this district.

B. B.

VELU (H.). **Les affections du cheval à parasites endoglobulaires au Maroc.**—*Bull. Soc. Path. Exot.* 1918. Jan. Vol. 11. No. 1. pp. 26–27.

"Equine piroplasmosis" was recorded in Chanoia in 1908 and has been proved to exist in isolated cases throughout Morocco. The

author has been able by blood examination to divide the disease into two forms one due to *Piroplasma caballi*, the other to *Nuttallia equi*. A brief description of the clinical phenomena produced by these parasites and of the findings at autopsy is given.

B. B.

SERGENT (Etienne). **Sur un Leucocytozoon de la perdrix rouge d'Algérie.** (*Perdrix rubra* **Brisson**).—*Bull. Soc. Path. Exot.* 1917. Oct. Vol. 10. No. 8. pp. 701–702. With 1 fig.

In two out of three red partridges examined in Algeria the author found a Leucocytozoon, only the adult gametes being present in the blood. The parasite is tapered at each extremity and may measure 46μ long. A short description of the male and female forms is given.

B. B.

LEGER (M.) & MOUZELS (P.). **Hématozoaire endoglobulaire non pigmenté d'une Anatidée.**—*Bull. Soc. Path. Exot.* 1917. Oct. Vol. 10. No. 8. pp. 699–700.

The authors refer to a paper by SERGENT which deals with a form of Proteosoma almost devoid of pigment in canaries [this *Bulletin*, Vol. 10. p. 255]. They proceed to give an account of a parasite which they found in red blood cells of the duck, *Anas discors* Latham. The parasite when fully developed is elongated and measures 8 to 9μ by 4·5μ, the young forms being rounded and measuring about 2μ. No pigment is seen, the nucleus is distinct but the protoplasm stains poorly; the host cells are not enlarged, do not lose their staining properties and the nucleus is not displaced markedly. Male and female forms cannot be distinguished. The parasite is not Haemoproteus nor a Plasmodium nor Toxoplasma.

B. B.

DA CUNHA (Aristides Marques). **Sobre a presença do balantidium no cavallo. Nota prévia.** [Balantidium in Horses. Preliminary Note.]—*Brazil Medico.* 1917. Oct. 6. Vol. 31. No. 40. p. 337.

A description is given of a balantidium found in the caecum and large intestine of a horse. The parasite measured 40 to 60μ by 35 to 40μ. A similar parasite had previously been found by the author in horse material, and it is noted that in these two horses no other ciliates were found in the caecum.

B. B.

i. PAPPENHEIMER (Alwin M.), VERMILYE (H. N.) & MUELLER (J. H.). **On the Etiology of Trench Fever (A Preliminary Communication).** —*Brit. Med. Jl.* 1917. Oct. 13. pp. 474–476. With 3 test-figs.

ii. PAPPENHEIMER (Alwin M.). **The Etiology of Trench Fever.** [Correspondence.]—*Ibid.* Oct. 27. p. 568.

i. The authors have found in blood smears, in cultures from the blood, in sections of periosteum and fascia and in cultures from these tissues an organism which they assign provisionally to the genus Piroplasma. Out of 150 cases of trench fever this organism was found in 9 in the peripheral blood.

They checked their observations by "many controls prepared with the identical stains."

Culture on the condensation water of meat infusion agar slants was apparently successful. Inoculations of rabbits, guinea-pigs and white rats with blood of patients and with suspensions of tissue gave no positive result either as regard febrile reaction or presence of parasites in the blood. Suggestions of a cycle in the louse are made.

ii. The letter concludes :—We wish to state that, as a result of our further experiences, we do not at present believe that the bodies described by us are micro-organisms or related in a causative way to the production of trench fever.

B. B.

LOW (George C.) ; DOBELL (Clifford). **The "Haemogregarine" of Trench Fever.** [Correspondence.]—*Lancet.* 1917. Sept. 22. pp. 473–474.

HENRY (Herbert). **The "Haemogregarine" of Trench Fever.** [Correspondence.]—*Brit. Med. Jl.* 1917. Dec. 1. pp. 739–740.

Low notes the importance of DIMOND's discovery should it prove to be correct. He casts doubt upon it.

Dobell criticises adversely DIMOND's paper [see this *Bulletin*, Vol. 10, p. 256]. He cannot understand the description given ; and the figures are also difficult of interpretation. He says "No protozoologist would, I believe, care to express a very definite opinion on these forms until he had studied the actual specimens from which they were drawn."

Henry has carried out water-filtering and culture experiments which he considers prove that DIMOND was dealing with protozoal biflagellates and a bacillus occurring in the distilled water which he was using, and that the parasite stages described by DIMOND are merely various stages of disintegration of these contaminating elements.

B. B.

ENTERIC FEVERS IN THE TROPICS.

MILLER (Charles Hewitt). **Goulstonian Lectures on Paratyphoid Infections.** Delivered before the Royal College of Physicians of London. —*Lancet.* 1917. May 19, June 2 & 16, pp. 747–751; 827–832; 901–905. With 10 charts.

These three lectures contain an excellent summary of what is known concerning the paratyphoid infections. The lecturer has obtained his material from recent literature, from notes of cases in the war area and from cases observed in the Red Cross Hospital, Netley. Long notice of the lectures is unnecessary since readers of this *Bulletin* will find individual records, upon which our knowledge of paratyphoid fevers is based, fully noticed in volumes 6 to 10.

J. H. Tull Walsh.

BOURGES (Henry). **Les formes actuelles du syndrome typhoïdique (infections à bacille d'Eberth et à bacilles paratyphiques).**—*Arch. Méd. et Pharm. Nav.* 1916. Oct., Nov. & Dec. Vol. 102. Nos. 10, 11 & 12. pp. 295–312; 366–383; 434–448; 1917. Jan. Vol. 103. No. 1. pp. 41–45.

The length of this paper is due to detailed examination of technique, symptoms and complications in cases for 1913, 1914 and 1915. The enteric fevers are considered in separate sections and, finally, among protected persons.

J. H. T. W.

MEDICAL RESEARCH COMMITTEE. **National Health Insurance. A Report upon the Use of Atropine as a Diagnostic Agent in Typhoid Infections.** By Capt. H. Fairley MARRIS.—50 pp. Special Report Series, No. 9. 1917. London: H.M. Stationery Office. [Price 1*s.* net.]

In Vol. 9, No. 9, of this *Bulletin* a full notice of Captain Marris' experiments with atropine was given. The investigations are continued and enlarged in the above "Report."

The following extracts will add to what was recorded in the *Bulletin* for June 15th, 1917:—

"The main purpose of this report is to show that under the conditions of work experienced in military hospitals in France, the subcutaneous injection of atropine is an excellent diagnostic test in distinguishing an infection belonging to the Typhoid Group. . . .

"We are faced by the fact that atropine fails to quicken the heart rate at certain stages of active typhoid infection; infection, interpreted as the mere presence of the bacteria in the body, also fails to affect the response—witness the soldiers who are carriers of the disease. . . . The response of the heart to atropine is deficient or is absent, so it would seem, only during the stage when the body is failing fully to cope with the poison introduced within it."

The "report" contains other very interesting investigations which must be briefly noticed:—

"ASCHER (*Bulletins et Mémoires de la Société Médicale des Hôpitaux de Paris*, 1914, Vol. 30, pp. 562–567) describes the effect produced on the heart rate by pressing upon the eyeball in a number of conditions. In normal individuals firm pressure maintained on the eyeball produces slowing of the heart's action."

TABLE XII.

Effects of Ocular Compression in Healthy Subjects.

	Pulse Before.	Pulse After.	Fall.
	Per minute.	Per minute.	
1. W.	88	72	16
2. S.	84	54	30
3. S.	70	48	22
4. A.	90	76	14
5. A.	80	64	16
6. A.	70	59	11
7. A.	64	60	4
8.	72	54	18
9.	83	70	13
10.	67	62	5

TABLE XIII.

Effects of Ocular Compression in Typhoid.

	Day of disease.	Pulse before.	Pulse after.	Fall.	Diagnosis.
1. L. ..	7th	60	60	0	Para. B isolated.
2. H. ..	29th	92	92	0	do.
3. R. ..	8th	81	81	0	do.
4. J. ..	11th	74	72	2	T. isolated.
5. D. ..	29th	84	82	2	do.
6. R. ..	29th	60	60	0	Para. B isolated.
7. H. ..	35th	60	62	–2	Para. A isolated.
8. E. ..	33rd	80	72	8	Typhoid group by agglutination.
9. Hy. .	6th	66	66	0	
10. W. ..	12th	82	78	4	
11. Sh. ..	50th	78	80	–2	
12. Bi. ..	12th	80	78	2	
13. Ba. ..	9th	91	92	–1	
14. G. ..	15th	70	78	–8	
,, ..	22nd	66	66	0	
,, ..	43rd	68	64	4	
,, ..	50th	70	60	10	
,, ..	70th	72	58	14	
15. F. ..	10th	60	60	0	Para. B isolated.
	18th	80	82	–2	
	23rd	88	80	8	
16. Z. ..	17th	88	92	–4	Para. B by agglutination.
17. R. ..	14th	68	72	–4	Para. B isolated.
18. A. ..	11th	68	66	2	T. by agglutination.
19. R. ..	20th	62	64	–2	do.
20. ..	6th	84	86	–2	Para. A by agglutination.
21. ..	Day before inoculation T.A.B.	84	70	14	
	8 days after	80	78	2	
	20 do.	86	70	16	

"As will be seen from the 'tables,' adrenaline, when administered intravenously to patients belonging to the Enteric Group, during the acute stage of the disease and while the patients were refractory to atropine, produced a rise of pulse rate of some 38 to 45 beats per minute . . . . similar to that witnessed in healthy men (25 to 45 beats). *But the injection did not produce the rise of systolic blood pressure seen in healthy men.*"

TABLE X.

Effects of Adrenaline in Healthy Men.

	Dose in Minims.	Pulse Rate.		*Rise.*	S.B.P.		*Rise.*
		Before.	After.		Before.	After.	
1. T. ..	·5	60	120	60	130	220	90
2. C. ..	2·5	67	120	53	120	180	60
	·5	68	95	27	115	140	25
	·25	75	100	25	90	100	10
3. W. ..	·25	85	130	45	133	190	57
4. Meg. ..	·25	78	103	25	120	180	60
5. P. ..	·25	80	108	28	150	195	45

Effects in cases of "Irritable Heart" (D. A. H.).

1. C. ..	·25	95	120	25	143	190	47
2. B. ..	·25	90	120	30	140	170	30

TABLE XI.

Effects of Adrenaline in Typhoid Cases.

	Dose.	Day.	Pulse Rate.			S.B.P.			Diagnosis.
			Before.	After.	*Rise.*	Before.	After.	*Rise.*	
1. Hor.	·25	17th	80	125	45	95	95	0	T. by agglutination.
2 Ho.	·25	16th	80	120	40	98	102	4	Para. B by agglutination.
3. B.	·25	11th	80	120	40	90	93	3	Para. B isolated.
4. S.	·25	13th	66	104	38	95	102	7	Typhoid organism isolated.
5. B.	·25	20th	90	108	18	112	130	18	Para. B by agglutination.
6. F.	..	9th	84	120	36	90	95	5	Para. B isolated.
7. M.	..	12th	72	115	43	94	104	10	T. isolated.

J. H. T. W.

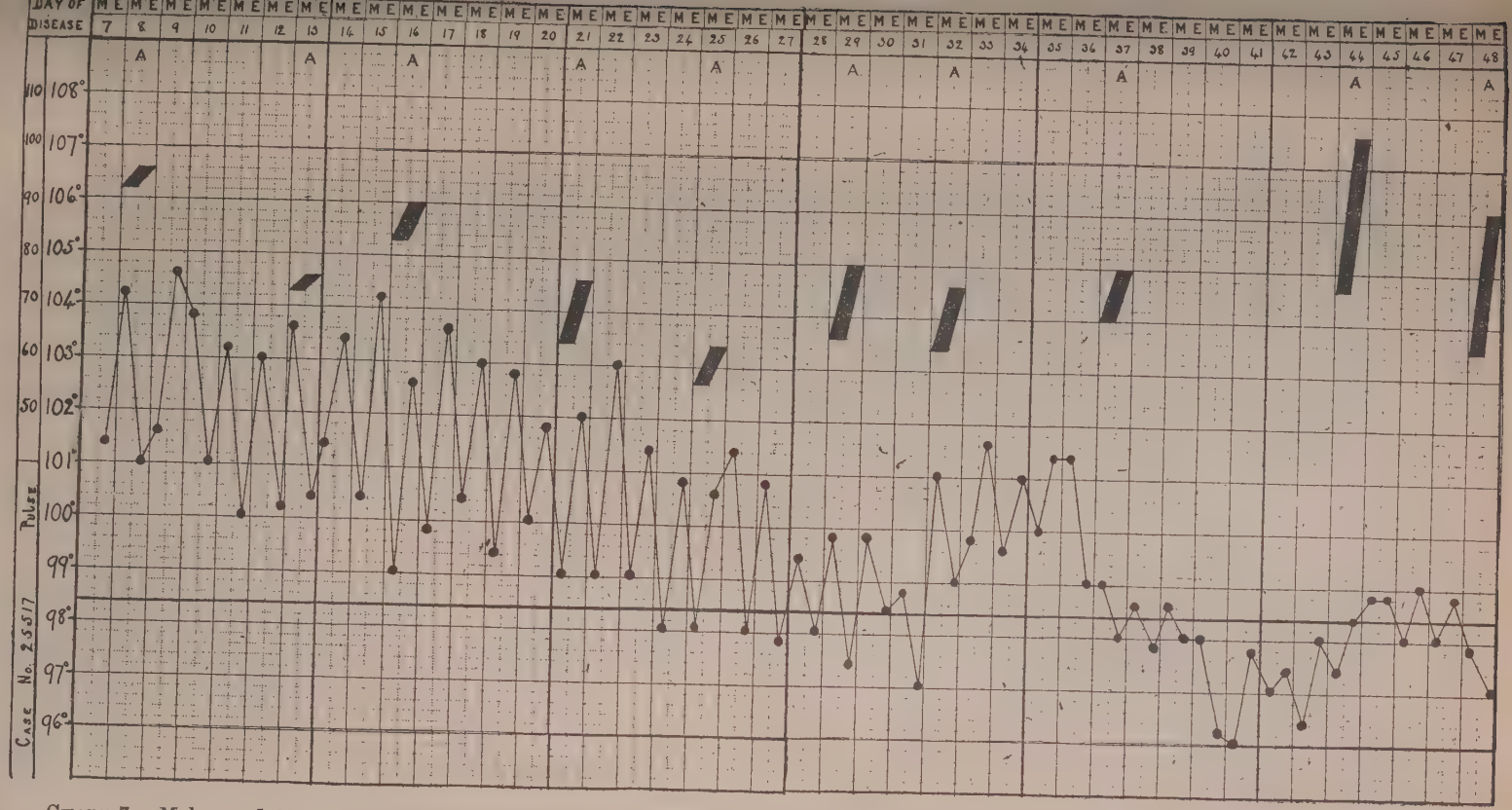


CHART 7.—Male, aged 20, white. Diagnosis, typhoid fever; admitted on the seventh day of the disease; Widal reaction negative; blood culture negative; Widal positive at a later date. Atropin tests: Dose one-thirtieth grain of atropin sulphate (hypodermically).

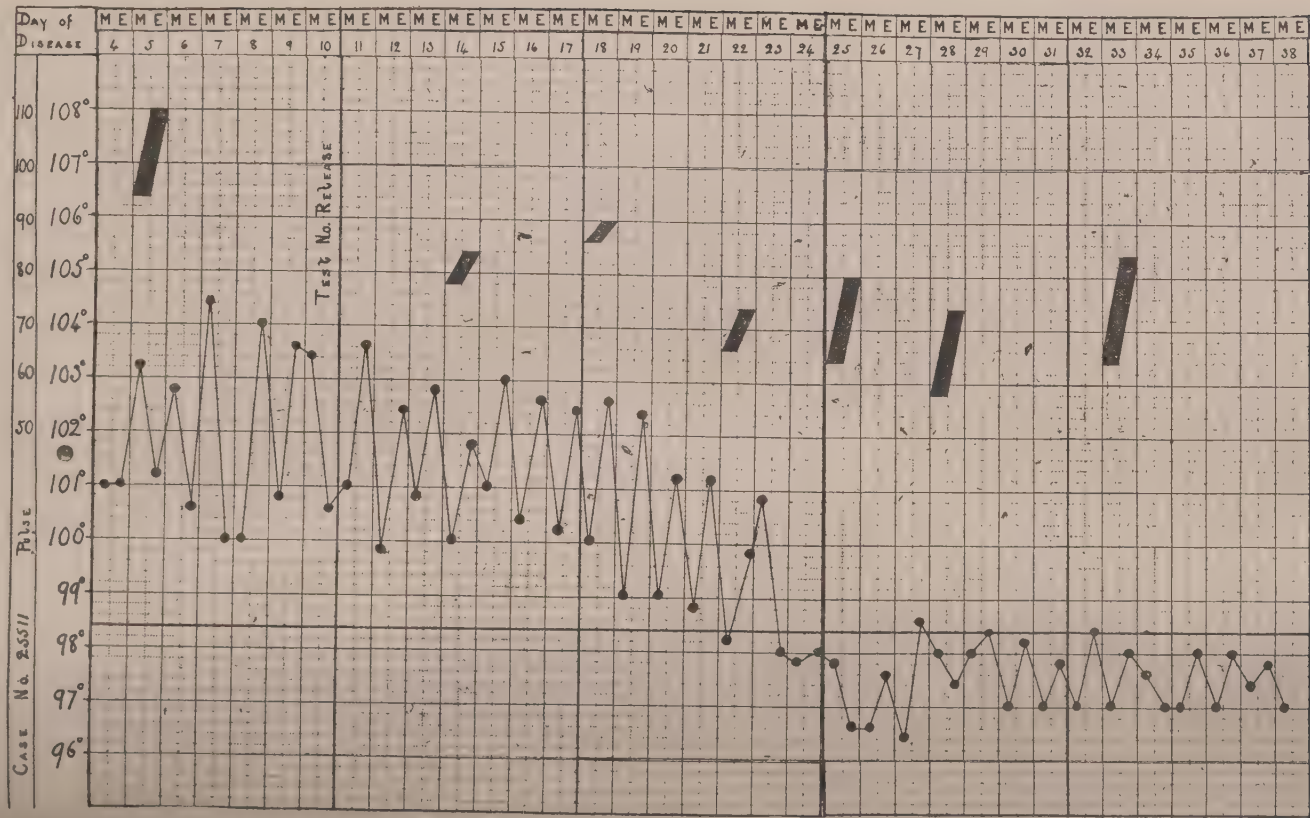


CHART 8.—Man, aged 25. Diagnosis, typhoid fever; admitted on the fourth day of the disease; Widal reaction negative;

MASON (Edward H.). **The Value of the Atropin Test in the Diagnosis of Typhoid Fever.**—*Arch. Intern. Med.* 1918. Jan. 15. Vol. 21. No. 1. pp. 1–13. With 8 charts.

Dr. Mason's work has been carried out at Montreal and continues work done by H. Fairley MARRIS who first suggested the "Atropin Test" [see this *Bulletin*, Vol. 9, p. 466; also p. 432.] In the Royal Victoria Hospital, Montreal, "within the last few months we have carried out the test according to MARRIS' technic on 109 patients, sixty-three of them suffering from typhoid, or paratyphoid B infections, and forty-six nontyphoid cases. In all, 305 tests were performed." The author then quotes the technique given by MARRIS (*q.v.*). Charts 7 and 8 can be compared with those given by MARRIS [*loc. cit.*].

"Eleven of the typhoid group failed to give the reaction." These cases are classified in "Table 2."

"The reaction becomes positive at about the tenth and disappears at about the thirty-first days of disease.

"In the nontyphoid group three cases gave a positive reaction. We offer no explanation of these findings.

"In the diagnosis of fevers of the enteric group, we believe the test to be of great value, and in many cases undoubtedly precedes the Widal reaction."

TABLE 1.

Results of the Atropin Test in Seven Cases Showing the Variability in Time of Appearance of a Positive Widal Reaction.

Case No.	Sex	Day of Disease	Release	Widal (Mac.)	Blood Culture
25537	♂	6 10	87–100 = 13 82– 88 = 6	5th day of disease, negative for B. typhosus	Positive for B. typhosus
25625	♂	9 13	77– 98 = 21 82– 88 = 6	8th day of disease, positive (1–80) for B. typhosus	Positive for B. typhosus
25662	♀	10 16	111–132 = 21 115–120 = 5	10th day of disease, positive (1–160) for B. typhosus	Positive for B. typhosus
25515	♂	5 10	94–110 = 16 86– 86 = 0	4th day of disease, negative for B. typhosus	Positive for B. typhosus
25521	♂	18 22	81–104 = 23 79– 86 = 7	18th day of disease, positive for B. typhosus	Positive for B. typhosus
25128	♂	11 15	98–116 = 18 95–100 = 5	15th day of disease, negative for B. typhosus	Positive for B. typhosus
25700	♀	9 15	106–122 = 16 114–122 = 8	8th day of disease, positive for B. typhosus (1–80)	Positive for B. typhosus

"As a means of diagnosing the syndrome termed vagotonia we would suggest the use of atropin in the above manner."

J. H. T. W.

TABLE 2.

Data Concerning Eleven Cases which Failed to Give a Positive Reaction to the Atropin Test.

Serial No.	Case No.	Sex.	Age.	Day of Disease.	Release.	Widal (Mac.).	Blood Culture.	Remarks.
1	25310	♂	32	6	99–116=17	Negative for B. typhosus (5th day of disease)	Negative for B. typhosus (5th day of disease)	Only 1 test diagnosis doubtful
2	25296	♂	32	11 25 31 42	60– 73=13 48– 65=17 57–101=44 82–100=18	Negative for B. typhosus (10th day of disease)	Positive for B. typhosus (10th day of disease)	
3	25284	♂	28	28	108–124=16	Negative for B. typhosus (28th day of disease)	Positive for B. typhosus (28th day of disease)	Died 9 days later; only one test made
4	25445	♂	18	11 19 27 31	99–126=27 88–100=12 66– 84=18 77– 92=15	Negative for B. typhosus (9th day of disease)	Positive for B. typhosus (9th day of disease)	

6	25595	♂	18	15 20	86–104=18 80– 94=14	Positive for B. typhosus (15th day of disease)	Positive for B. typhosus (15th day of disease)	Died 29th day of disease
7	25096	♂	25	16	105–120=15	Positive (1–80) for B. typhosus (12th day of disease)	Negative	One test
8	24958	♂	30	29	82–114=32	Positive (1–80) for B. typhosus (9th day of disease)	Negative	One test
9	25691	♂	23	15 22 27	70–100=30 75– 92=17 96–120=24	Positive (1–80) for B. typhosus (18th day of disease)	Negative	
10	25119	♂	38	17	74– 88=14	Positive (1–80) for B. typhosus (14th day of disease)	Negative	One test
11	25653	♂	27	21 24 38 42	84–112=28 91–112=21 93–112=19 86–112=26	Positive (1–160) for B. typhosus (20th day of disease)	Negative	

British Medical Journal. 1918. Mar. 9. pp. 296–298. With 1 chart.—**Second Report of the Committee on Pyrexia of Unknown Origin and Trench Fever. The Diagnosis of P.U.O. from Enteric.**

Two hundred cases form the material of this Report. The clinical examination has been carried out by Captain Horsley Drummond; the pathological work by Captain W. H. Perkins. Cultures were made from the blood in all cases admitted at a sufficiently early period of the disease, and while the patient remained in hospital, stools and urine were examined twice weekly. The agglutination titre was determined at least thrice, by Dreyer's method, in every case.

The diagnosis of enteric fever has been rendered more difficult by the introduction of prophylactic inoculations.

"1. Of 200 cases admitted under the diagnosis of P.U.O. or trench fever, 7 or 8 per cent. were proved on serological evidence to be enteric.

"2. While in hospital the clinical symptoms of these cases were no more distinctive of enteric than those of many others in which the serological evidence was negative."

J. H. T. W.

Horák (Ottokar). **Beobachtungen über Paratyphus A.** [Observations on Paratyphoid A.]—*Wien. Klin. Woch.* 1917. Sept. 6. Vol. 30. No. 36. pp. 1135–1137.

The author, a military surgeon, notes that owing to the movement of troops from one front to another paratyphoid A infection, rarely seen in Europe before 1914, is now a widely spread disease. In only 9·5 per cent. of the numerous cases was the bacillus found in the blood. The agglutination titre was as a rule low. The clinical features were those usually found and which have been previously described [see this *Bulletin*, Vol. 8, pp. 79–81; Vol. 9, pp. 472–473].

J. H. T. W.

Sluka (Erich) & Strisower (Rudolf). **Der Paratyphus A an unserer Südwestfront (Tirol).** [Paratyphoid A on the South-West Front.]—*Münch. Med. Woch.* 1917. Sept. 25. Vol. 64. No. 39. pp. 1278–1281. With 2 charts.

After some introductory remarks concerning bowel diseases usually prevalent among troops in time of war the authors report that there were but few cases of typhoid fever up to the end of 1916.

"It was otherwise with *B. paratyphosus* B. In the early part of the year only sporadic cases appeared, but the infection appeared in epidemic form in July, August and September."

"Paratyphoid A epidemics were recorded on the East, West and Southeast fronts." The disease was introduced by enemy troops from the East and from North Africa. The course of an epidemic is described and the clinical and other features of paratyphoid A infection are discussed. The authors state that within their experience "the prognosis of paratyphoid A is not unfavourable and few complications occur." A few severe cases with high temperature, delirium and enlargement of the spleen were observed. "Among the 65 patients observed by us 10 died." All fatal cases were of the serious type.

With other observers of this disease the authors note that the agglutination titre is not very high and that "at the end of the first month of the illness and during convalescence there is a marked reduction of titre." [cf. SVESTKA: this *Bulletin*, Vol. 8, p. 99.]

J. H. T. W.

ETIENNE (G.). **Fièvres typhoïdes et paratyphoïdes A mixtes.**—*Bull. Acad. de Méd.* 1918. Jan. 29. 3 Ser. Vol. 79. Year 82. No. 4. pp. 86–89.

The author records cases of mixed infections:—

"I have lately observed three cases of this kind, by *B. typhosus* of Eberth and *B. paratyphosus* A; mixed infections from the beginning since blood culture has isolated the two elements, on the 5th day, the 6th day and the 11th day." These patients had not received any protective vaccine. The symptoms were very severe in two cases and severe in the third case.

As regards the evolution of agglutinins:—

"For *B. typhosus*, in the child of fourteen years, the sero-agglutination began with 1 in 40 on the 7th day, rose to 1 in 80 on the 12th day, then diminished, to rise again to 1 in 100 towards the end." This patient died.

"In the soldier agglutination appeared very slowly, reaching 1 in 20 only on the 32nd day, during convalescence it increased to 1 in 200, diminishing later on."

"In a woman, it was negative on the 9th day, 1 in 40 on the 11th day, 1 in 60 on the 14th day, then diminished."

"Agglutination for *B. paratyphosus* A was only obtained in one case": the woman, towards the end of the disease, gave a fugitive reaction of 1 in 20, when the titre for *B. typhosus* was low. [cf. CASTELLANI—this *Bulletin*, Vol. 6, p. 17.]

J. H. T. W.

GILDEMEISTER (E.). **Ueber Dauerausscheider von Paratyphus B-Bacillen.** [Long Duration of Paratyphosus B Excretion.]—*Cent. f. Bakt.* 1. Abt. Orig. 1916. July 31. Vol. 78. No. 3. pp. 129-136. With 8 figs.

The author reports "two cases of patients who for long periods excreted *Paratyphosus* B bacilli; of these one is remarkable on account of the nature and site of elimination, the other on account of certain peculiarities which characterised the bacilli."

Case 1. [abridged]. W. G. S., aged 39; admitted to Posen Hospital October 6th, 1914, with an open sinus, right fore-arm. In 1903 suffered from typhoid fever; about 3 weeks before convalescence set in the man suddenly became paralysed over the whole of the right side; the skin was red and swollen; ten days later swellings appeared on the right forearm, and right leg just below the knee. Abcesses formed and were opened. The sore on the leg healed very slowly, the cavity in the arm closed and re-opened several times during several years. All signs of paralysis only disappeared six months ago. In September 1914 the man complained of pain in the joints of the right side and especially in the right arm. The discharge from the sinus was inoculated [streaks] into Conradi-Drigalski plates and *B. paratyphosus* B obtained. No typhoid bacilli were found.

The patient's serum agglutinated the bacilli from the cultures in a titre of 1 : 200. No bacilli were found in either urine or faeces. Dr. Gildemeister considers that this man had been excreting and spreading abroad *B. paratyphosus* B for 11 years.

Case 2. Reservist P. E., aged 24. Taken ill suddenly, with rigors and vertigo, pain in the chest and diarrhoea, November 21st, 1914. The stools at times contained blood. On Conradi-Drigalski plates *B. paratyphosus* B appeared in pure culture ; but numerous similar experiments with faecal matter showed many atypical colonies of bacilli resembling in other characters the normal bacillus.

Investigations were made at intervals from December 1914 to May 6th (Table I) 1915, and similar results obtained throughout that period and were still present in 1916. The different forms of colony often occurred side by side on plates inoculated from the same stool."

J. H. T. W.

BANKS (H. Stanley) & EVANS (H. Roker). **Thrombosis of Cerebral Arteries in Paratyphoid B Fever, occurring in a General Hospital in Salonika Army.**—*Jl. Roy. Army Med. Corps.* 1918. Jan. Vol. 30. No. 1. pp. 100–101.

The authors, medical officers in the R.A.M.C., state that this case "presents two features of interest."

"It illustrates in the first place the severe toxaemic form which this usually mild fever occasionally assumes, and in this connexion we may remark that our patient had not been inoculated against paratyphoid A and B. In the second place, it furnishes another example of arterial thrombosis complicating the disease—a complication which has been rarely noted even in typhoid fever, and which, apart from Macadam's case, has not, so far as we are aware, been described in connexion with paratyphoid fever."

The patient, an officer aged 21, was admitted on December 6th, 1916, on the third day of illness. Symptoms : shivering, headache and diarrhoea. Temp. 104·8° F. ; it remained high and continuous. On the fourth day blood for culture yielded *B. paratyphosus* B. On the sixth day :—"delirium, furred and very dry tongue, and a large crop of small rose spots present all over the trunk." On the twelfth day : "unconscious and was then found to have a complete right-sided hemiplegia. . . . death took place forty-eight hours later, the temperature rising to 106° F. before death."

"The left internal carotid artery was thrombosed where it entered the skull, and the thrombosis extended to the anterior and middle cerebral arteries. . . . The anterior cerebral was thrombosed in the first half-inch of its course, and beyond this the vessel and its branches were collapsed. The middle cerebral was completely thrombosed throughout its course in the Sylvian fissure and the thrombosis involved both its basal and its cortical sets of branches." Full details of the autopsy are recorded. [cf. MACADAM—this *Bulletin*, Vol. 9, p. 20.]

J. H. T. W.

GAY (Frederick P.). **Further Experience in the Treatment of Typhoid Fever by the Intravenous Injection of Sensitized Typhoid Vaccine Sediment.**—*Jl. Lab. & Clin. Med.* 1917. Aug. Vol. 2. No. 11. pp. 785–803. With 3 figs.

"This article records our experience in the treatment of ninety-eight authenticated cases of typhoid fever over a period of two and one-half years by the intravenous injection of a polyvalent sensitized typhoid vaccine

sediment (Gay-Claypole vaccine).... We regard the treatment as indicated in any case of typhoid fever that is still febrile, on the basis of our results which seem excellent. The mortality in these cases was low (6·6 per cent.) and the complications few. Relapses were distinctly reduced in those cases in which the intravenous injections were followed by a series of three subcutaneous inoculations after the temperature had reached normal. . . .

"The usual amount on initial injection has been 1/50 of a milligram (corresponding to 150 million bacteria), and a corresponding dose in children, who, as in prophylactic immunization against typhoid, react less markedly than adults to corresponding amounts. . . .

"In one-third of the cases the temperature fell critically following the first or second injection, and a permanent normal was established on the average within a week after beginning treatment."

A comprehensive bibliography is given.

J. H. T. W.

DIACONO (Hector). **La typho-uro-réaction. Nouvelle méthode de diagnostic urologique de la fièvre typhoïde.**—*Presse Méd.* 1917. Oct. 22. Vol. 25. No. 59. pp. 611–612. *Arch. Inst. Pasteur de Tunis.* 1917. Oct. Vol. 10. No. 1–2. pp. 82–87.

The author says of *B. typhosus* :—

"The agglutinable and precipitable elements of the antigen, arrived at the level of the renal glomerulus may, *in part*, pass through it by incomplete filtration before it has been submitted to the digestive action of the bacteriolysins.

"The hypothesis of an incomplete renal filtration in the case of infection with Eberth's bacillus is founded upon the frequent observation in the urine of typhoid cases of bacilluria, upon the normal retention of chlorides, the almost constant presence of pathological albumin from a chemical point of view and of renal cylinder casts from the microscopic point of view.

"In the method of Bormans and Beniasch the urine acts as an antiserum ; in my method the antiserum is added to the urine."

Technique :—"According to the experiments of Joos chloride of sodium is absolutely necessary for the production of the phenomena of agglutination."

The required amount of chlorides in the urine, expressed as NaCl, is from 7·0 to 8·0 grammes per litre. The urine for 24 hours is collected. If clear it can be used at once ; if turbid it should be allowed to settle and the clear fluid can be used. The amount of chloride is estimated. If less than 8·0 gm. per litre, NaCl must be added.

The test serum used would agglutinate *B. typhosus* in a titre of 1 : 10,000.

The serum before addition to the urine is "diluted to one fifth with physiological salt solution."

	Urine.	Agglutinating serum diluted to 1/5.	
(a)			
Tube 1.	20 cc.	0·5 cc.	
,, 2.	20·5 cc.	nil	(control)
,, 3.	20·0 cc. urine of healthy man	0·5 cc.	(control)

"If the test is positive tube No. 1 will show, after resting in the incubator, at 37° C., for three or four hours, a characteristic flocculent deposit; tubes 2 and 3 (control tubes) will not show any change."

(b) Showing sensibility of the reaction :—

	Urine.	Agglutinating serum diluted 1/5.
Tube 1.	20 cc.	+1·0 cc.
,, 2.	,, ,, ...	0·75 ,,
,, 3.	,, ,, ...	0·5 ,,
,, 4.	,, ,, ...	0·4 ,,
,, 5.	,, ,, ...	0·3 ,,
,, 6.	,, ,, ...	0·2 ,,
,, 7.	,, ,, ...	0·1 ,,
,, 8.	,, ,, ...	nil (control)
,, 9.	,, ,, urine of healthy man ..	1·0 cc. (control)

Placed as before in incubator for three or four hours at 37° C. the tubes 1 to 7 show a flocculent deposit decreasing in amount from tube 1 to tube 7. The control tubes 8 and 9 remain without deposit.

The author claims that this reaction appears early, before the serum-reaction of Widal and before the presence of indol is shown by the "diazo" test. He further states that he has tested urine from other diseases and without getting the characteristic deposit.

J. H. T. W.

NICOLLE, RAPHAEL (A.) & DEBAINS (E.). **Etudes sur le bacille d'Eberth et les bacilles paratyphiques.**—*Ann. Inst. Pasteur.* 1917. Aug. Vol. 31. No. 8. pp. 373–402.

The authors divide their work into two sections. The first portion dealing with 70 specimens, mostly obtained by blood-culture from patients during the course of the "fever," describes: Morphological characters; negative and positive reactions in various media and passage by sub-culture in Fränkel's fluid.

The second section contains results of agglutination experiments. In both sections the authors record the finding of abnormal bacilli [cf. SARRAILHÉ & CLUNET; SVESTKA; ARCHIBALD, HADFIELD, etc., this *Bulletin*, Vol. 8, pp. 73 & 89; also COURMONT, CHATTOT & PIERRETT, ARCHIBALD, HADFIELD, etc., Vol. 9, pp. 14 & 1–4].

The results of work recorded in the first section are brought together in the "Table" on opposite page.

The milk used was fresh and not skimmed.

The formula for Fränkel's fluid is :—

Sodium chloride	5 gm.
Bipotassic phosphate	2 ,,
Asparagin	4 ,,
Ammonium lactate	6 ,,
Distilled water	1,000 ,,

Tubes were inoculated with one drop of a broth culture and then again subcultured by inoculation of tube No. 2 from No. 1. Of this method the authors write :—

"The essential fact is the possibility or impossibility of obtaining a development in the second Fränkel tube."

J. H. T. W.

	Liquide Fränkel	Gélose au sous-acétate de plomb	Gélose au rouge neutre	Eau peptonée et glucosée	Petit-lait tournesolé	Lait tournesolé
Bacilles typhiques. [Nos : 2, 9, 10, 11, 12, 13, 16, 17, 18, 20, 30, 35, 36, 37, 38, 48, 58, 61, 63, 68.]	*Absence de passages.*	*Strie noire.* Milieu non modifié en général.	*Pas de virage. Pas de fluorescence.*	*Pas de gaz.*	*Acidification légère, puis retour à la teinte sensible. Pas de voile.* (Dans un seul cas, No. 11, réduction).	*Acidification légère, puis retour à la teinte sensible. Pas de bleuissement de la surface.*
Bacilles paratyphiques A. [Nos : 22, 23, 56, 59, 66, 67, 69, 70, 71.]	*Absence de passages.*	Strie blanche ou strie grise étroite après 24 heures. *Donc : production d'H^2S nulle ou pratiquement nulle.*	*Virage et fluorescence* constants, mais réaction souvent incomplète après 48 heures.	*Gaz.*	*Acidification légère, persistante ou suivie d'un retour à la teinte sensible.* Parfois, tout s'arrête rapidement à cette teinte. *Pas de voile.*	*Acidification légère, s'écartant peu de la teinte sensible. Pas de bleuissement de la surface.*
Bacilles paratyphiques B. [Nos : 1, 3, 4, 8, 14, 15, 19, 25, 26, 31, 32, 57, 60, 64 65, 80.]	*Passages.*	*Strie noire* intense. Généralement diffusion dans le milieu.	*Virage et fluorescence* constants ; d'ordinaire complets après 48 heures	*Gaz.*	*Virage au bleu*, inconstamment précédé d'acidification, inconstamment suivi de réduction. Parfois, acidification légère, immédiatement suivie de réduction. *Voile bleu*, après 24–48 heures.	*Acidification légère peu durable puis, virage au bleu* de plus en plus intense. Ce virage est précédé, dans la majorité des cas, d'une phase de réduction (décoloration du milieu). *Bleuissement de la surface.*

MACKIE (T. J.). **The Brilliant Green Enrichment Method for the Isolation of the Paratyphoid Bacilli from Faeces.**—*Jl. Roy. Army Med. Corps.* 1917. Oct. Vol. 29. No. 4. pp. 457–462.

The author gives in detail a series of plating experiments showing the usefulness of Brilliant Green with MacConkey's medium for the culture of paratyphoid bacilli.

"As will be seen from these examples the optimum amount of brilliant green necessary to elicit the maximum growth of the typhoidal bacilli varies with each specimen of faeces though lying within a certain range, i.e., from 0·25 cubic centimetre to 0·7 cubic centimetre of a 1 in 10,000 solution, and the resulting bacterial growth may be completely altered by even slight variations in the amount of the reagent used."

References to other papers are given [cf. also: TIDY & DUNN, this *Bulletin*, Vol. 9, p. 19].

J. H. T. W.

HULTON-FRANKEL (Florence) & MACDONALD (Katherine). **Differentiation of Typhoid, Paratyphoid A and B by Means of a Dextrin-Inosite Medium.**—*Proc. Soc. Experim. Biol. & Med.* 1917. Dec. 19. Vol. 15. No. 3. p. 31.

(From Harriman Research Laboratory, Roosevelt Hospital, New York.)

The medium consists of 3 per cent. agar containing 1 per cent. inosite and 1 per cent. dextrin, using litmus as an indicator. The dextrin must be one of the lower dextrins.

B. typhosus ferments the dextrin with acid formation in the butt of the tube, decolorizing entirely in 24 hours, with a violet slant.

B. paratyphosus A does not ferment either dextrin or inosite; the butt and the slant of the tube remain violet in colour.

B. paratyphosus B ferments the inosite with gas formation; decolorizes the butt of the tube with the formation of gas bubbles; the slant remains violet.

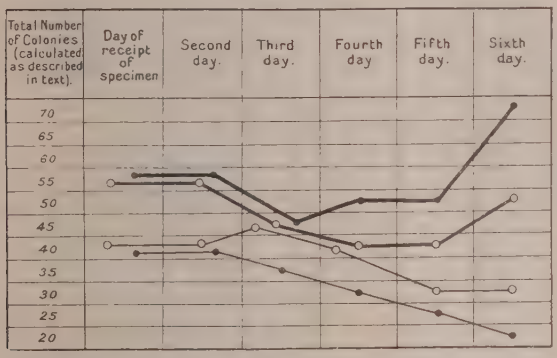
J. H. T. W.

BENIANS (T. H. C.). **The Preservation of Typhoid and Paratyphoid Bacilli in Stools by Emulsifying in Glycerine.**—*Lancet.* 1918. Feb. 16. pp. 255–256. With 2 charts.

"Teague and Clurman [*Jl. Infect. Dis.* 1916. June. pp. 653–671] have shown that by emulsifying infected stools in 30 per cent. glycerine the typhoid bacillus can be kept living, and can be isolated, for some length of time after it has died out from a control specimen emulsified in saline." The author has extended the research to include the paratyphoid bacilli. "A small amount of faecal material from each case, about 5 gr." was placed in each of two 20 cc. glass pots. To one was added 10 cc. of 30 per cent. glycerine diluted in 0·6 saline; to the other 10 cc. of the saline only. The faeces were emulsified by stirring up in the fluids. Daily platings from the specimens were made with a measured quantity of the supernatant fluid spread evenly on a well dried McConkey plate; one plate for each specimen. The specimens were kept on the bench at laboratory temperature, approximately 16° C., and results were observed after 24 hours incubation. The number of colonies on each plate was then calculated.

Chart 1 shows that the coliform organisms are kept in check whilst the non-lactose fermenters are, to a large extent, preserved in the glycerine emulsion. In the saline emulsions the reverse is the case, the non-lactose fermenters dying out, the coliform bacilli rapidly increasing, especially on the fifth and sixth days. At summer temperatures this increase is more rapid than at winter temperatures.

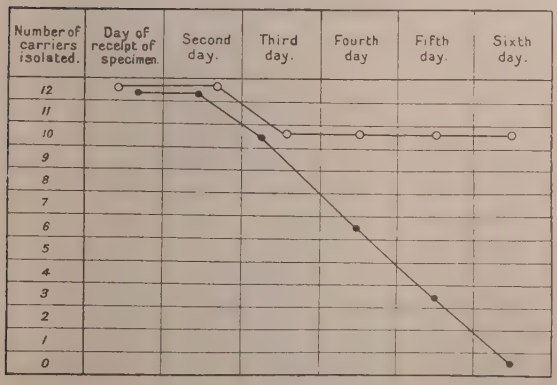
Chart 1.*



Showing total daily number (as calculated) of both red and white colonies from glycerine and saline faecal emulsions in 18 cases.

Lactose fermenters.
Non-lactose fermenters.
Glycerine emulsions (with circle).
Saline emulsions (with dot).

Chart 2.*



Showing number of carriers from whom the pathogenic organisms were isolated each day, from both glycerine and saline emulsions.

[* Reproduced by permission from the *Lancet*.]

Chart 2 shows the rapid disappearance of the pathogenic bacteria from the saline emulsions and preservation of *Enterica* bacilli in glycerine emulsions.

J. H. T. W.

HOOKER (Sanford B.). **A Comparison of the Antigenic Properties of Different Strains of** *Bacillus typhosus.*—*Jl. Immunology.* 1916. Dec. Vol. 2. No. 1. 22 pp.

This report from the Hearst Laboratory of Pathology and Bacteriology, University of California, emphasizes the importance of variation. It is not easy to condense, but the "Summary" will give a sufficient idea of the author's work and results :—

"By means of the alexin-fixation reaction it has been found possible to demonstrate consistent antigenic differences among some strains of *B. typhosus.* In accordance with these differences a number of strains have been tentatively allocated in three fairly well-defined groups. Group I is made up of strains of rather recent isolation; no strain in this group has been under artificial cultivation for more than two years. Older strains, isolated from three to fifteen years ago, compose Group II. The third group is made up of those strains that fall neither in Groups I nor II, and that cross-fix irregularly with each other and with members of the other groups. Group III strains are all more than three years old.

"By means of agglutinin-absorption experiments, findings have been obtained that, in general, harmonize strikingly with the results of cross-fixation. This confirmatory evidence, secured by a widely different serologic method, tends strongly to prove that these antigenic differences among typhoid strains, as demonstrated by alexin-fixation, represent an actual condition and are not fortuitous. . .

"The facts that a serum immune to any recently isolated strain cross-fixes with all other strains, old or young, while sera immune to older strains do not so cross-fix, would lead to the seemingly justified assumption that only do the young strains contain all of the antigenic complexes of typhoid bacillary protein. The logical conclusion, then, would be that a young strain ought to afford the most efficient protection when used for prophylactic immunization against typhoid fever. However, the results of the work on agglutinin-absorption, if correctly interpreted, do not warrant the assumption that a univalent [one strain only] vaccine is sufficient. . . . . It seems advisable, for the present, to recommend the use of a balanced polyvalent typhoid vaccine, for immunizing and therapeutic purposes, compounded in accordance with these groups."

[Compare the physiological variation of *Meningococcus Wechselbaumi* which makes the use of at least four varieties necessary in preparing a useful "anti-serum" for cerebro-spinal meningitis.]

J. H. T. W.

GARROW (R. P.). **Studies in Agglutination.**—*Jl. Roy. Army Med. Corps.* 1917. Oct. Vol. 29. No. 4. pp. 412–438. With 3 charts.

The following extracts, charts and "tables" from this long and carefully written paper will give some idea of its value. The work was done in the Military Hospital, Malta.

Captain Garrow, R.A.M.C, records :—

I. The course of agglutinin production, after protective typhoid inoculation, in 204 healthy persons, officers, nurses, N.C.O.'s and privates. Four are omitted from the charts, etc., as they failed to show "T-agglutination in titre of 1 in 10 or upwards."

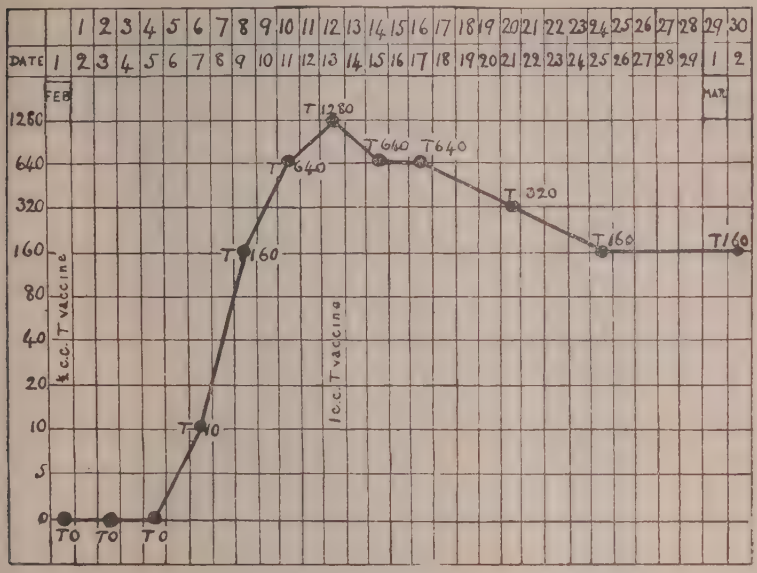


CHART I.—Agglutinogram showing the T-inoculation agglutinin titres obtained by repeated examinations of the blood of an individual for one month after T-inoculation. The examinations were made by means of the clinical agglutinometer. No agglutinins for A or B were detected in dilution of 1 in 10 or upwards.

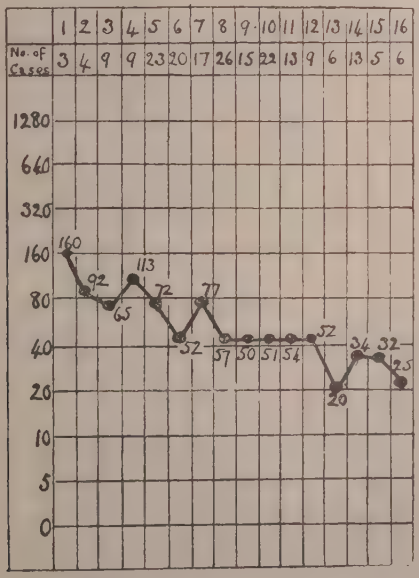


CHART II.—Composite agglutinogram indicating average titres at monthly intervals of 200 T-inoculated persons. The examinations were made by means of the clinical agglutinometer. No agglutinins for A or B were detected in 1 in 10 or upwards.

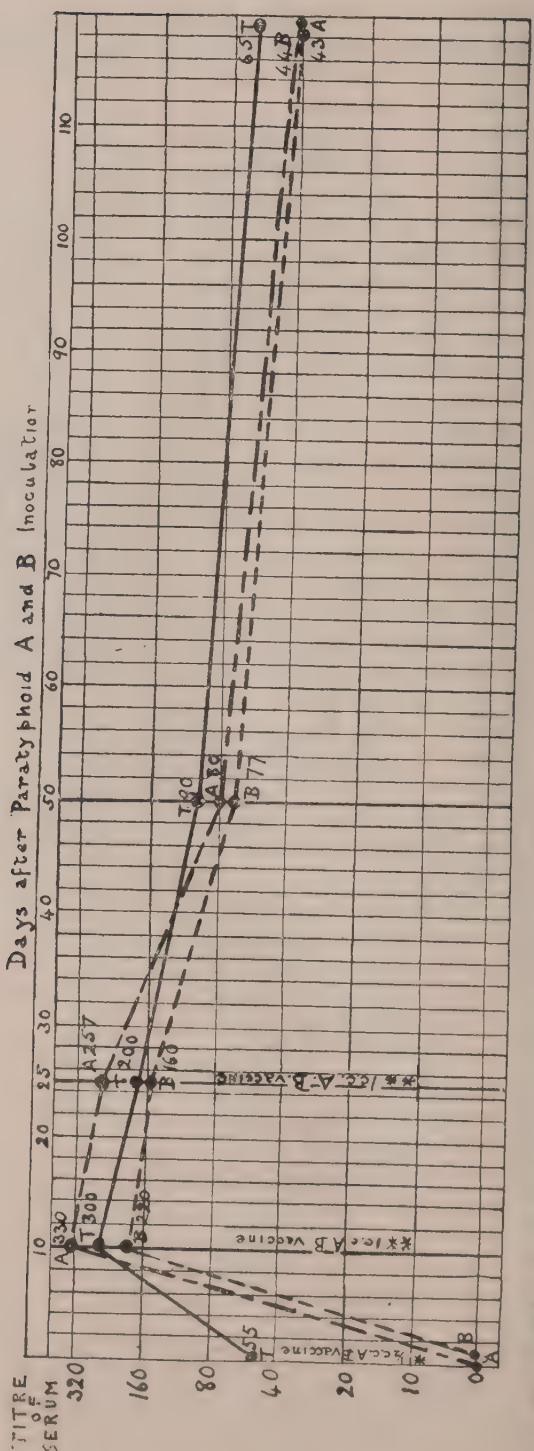


CHART III.—Shows the average course of agglutination after paratyphoid A and B inoculation in 100 persons who were previously inoculated against typhoid fever.

[Charts I, II and III reproduced by permission from the *Journal of the Royal Army Medical Corps.*

"These two charts read together, show clearly the five phases in the agglutinin response to antityphoid inoculation, viz. :—

"(a) A latent period of four or five days, during which time no agglutinin was detected in dilution of 1 in 10 or higher.

"(b) A period of rapidly rising titre setting in about the fifth or sixth day, and lasting till the twelfth day.

"(c) A maximum agglutinin titre reached on the twelfth day after inoculation.

"(d) A period of rapidly falling titre lasting from the twelfth day till about the twenty-fourth day.

"(e) *A period of residual agglutinin* commencing about the twenty-fourth day after inoculation, and lasting until the inoculation agglutinin finally disappears entirely from the blood."

TABLE III.

	Number of cases	Average agglutinin titre	Average time in months after inoculation
Local reaction			
Mild	159	60	8 months.
Moderate	26	75	8 ,,
Severe	15	43	9 ,,
General reaction			
None	46	60	7 to 8 months.
Mild	116	60	8 to 9 ,,
Moderate	25	70	7 to 8 ,,
Severe	13	52	9 months.

"Table III shows that a moderate degree of reaction (local or general) produces a higher average residual agglutinin titre at eight months after inoculation than does a mild degree of reaction. A severe reaction, however, is followed by a lower average residual titre."

TABLE IV.

Agglutinin titres.	Months after Inoculation.																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Total cases.
1 in 320	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1 in 160	3	2	2	5	4	1	5	3	1	1	1	1	0	0	0	0	29
1 in 80	0	0	1	2	8	6	3	5	3	5	3	1	0	2	0	0	39
1 in 40	0	1	4	1	8	8	6	13	7	12	7	5	1	5	3	2	83
1 in 20	0	0	1	1	2	3	1	3	2	4	1	1	3	3	2	3	30
1 in 10	0	1	1	0	1	2	2	2	2	0	1	1	2	3	0	1	19
Total cases	3	4	9	9	23	20	17	26	15	22	13	9	6	13	5	6	200
Average titres	160	92	65	113	72	52	77	57	50	51	54	52	20	34	32	25	

"In Table IV, the 200 cases are arranged into sixteen monthly groups, according to the time that elapsed between inoculation and examination."

[This "table" agrees with the findings of other investigators.]

II.—Paratyphoid inoculation in Typhoid-Inoculated Individuals.

"R.A.M.C. paratyphoid vaccine :—

"1 cc. contains Para A ....500 millions
Para B ....500 ,,

"1st dose for an Adult, ½ cc. or 9 min.

"2nd dose ,, ,, ,, 1 cc. or 18 min."

"The object of this study was to obtain information which might be of value in the interpretation of agglutination results in cases of supposed enterica occurring in patients who had been inoculated against all three diseases."

TABLE I.

Indicating the "T" Inoculation Agglutinin Titres at Various Stages after Paratyphoid Inoculation.

"T" Agglutinin titre	Days after paratyphoid inoculation 0	10	25	50
0	1 case	1 case	1 case	1 case
10	9 cases	0 ,,	0 ,,	2 cases
20	17 ,,	4 cases	5 cases	7 ,,
40	42 ,,	3 ,,	7 ,,	31 ,,
80	19 ,,	16 ,,	16 ,,	27 ,,
160	12 ,,	38 ,,	40 ,,	24 ,,
320	0 case	17 ,,	20 ,,	3 ,,
640	0 ,,	17 ,,	8 ,,	0 case
1,280	0 ,,	2 ,,	0 case	0 ,,
Totals	100 cases	98 cases	97 cases	95 cases

TABLE II.

Indicating the "A" Agglutinin Titres at Various Stages after Paratyphoid Inoculation.

"A" Agglutinin titre	Days after paratyphoid inoculation 0	10	25	50
0	100 cases	0 case	1 case	3 cases
10	0 case	2 cases	0 ,,	4 ,,
20	0 ,,	1 case	1 ,,	10 ,,
40	0 ,,	10 cases	8 cases	35 ,,
80	0 ,,	11 ,,	20 ,,	21 ,,
160	0 ,,	22 ,,	20 ,,	18 ,,
320	0 ,,	25 ,,	31 ,,	4 ,,
640	0 ,,	24 ,,	15 ,,	0 case
1,280	0 ,,	1 case	1 case	0 ,,
2,560	0 ,,	2 cases	0 ,,	0 ,,
Totals	100 cases	98 cases	97 cases	95 cases

TABLE III.

Indicating the "B" Agglutinin Titres at Various Stages after Paratyphoid Inoculation.

"B" Agglutinin titres	Days after paratyphoid inoculation 0	10	25	50
0	100 cases	3 cases	1 case	2 cases
10	0 case	1 case	2 cases	4 ,,
20	0 ,,	3 cases	2 ,,	9 ,,
40	0 ,,	5 ,,	7 ,,	35 ,,
80	0 ,,	20 ,,	31 ,,	26 ,,
160	0 ,,	33 ,,	35 ,,	16 ,,
320	0 ,,	23 ,,	15 ,,	3 ,,
640	0 ,,	9 ,,	4 ,,	0 case
1,280	0 ,,	1 case	0 ,,	0 ,,
Totals	100 cases	98 cases	97 cases	95 cases

The value of agglutination as diagnostic of enteric fever is considered in each section and the author insists upon "*the necessity for an intelligent interpretation of agglutinin results in conjunction with clinical facts.*"

J. H. T. W.

TAYLOR (Frank E.). **Castellani's Absorption Test: Its Technique and Applications.**—*Jl. Trop. Med. & Hyg.* 1918. Feb. 15. Vol. 21. No. 4. pp. 37–38.

This report is based on the author's "own experience and that of other workers."

"Having discovered this method of distinguishing between specific agglutinins and non-specific agglutinins, CASTELLANI [*Zeit. für Hygiene*, 1902] applied it to: (1) the diagnosis of mixed infections; (2) the differentiation of closely allied bacterial species and types." The details, somewhat condensed, are as follows:—

Technique of the Absorption Test.

Let us suppose we have a paratyphoid B serum agglutinating powerfully both the *B. paratyphosus* B and *B. aertryke*, the agglutination titre for both organisms being > 1 in 10,000.

(1) Dilute the serum with normal saline so as to have a 1 in 50 dilution (0·1 cc. serum plus 4·9 cc. normal saline); put 2·5 cc. of the diluted serum in a sterile centrifuge tube, "Tube No. 1." Put the same amount (2·5 cc.) in another centrifuge tube, "Tube No. 2."

(2) Scrape off with a platinum wire the growth of four or five agar slope cultures of *B. paratyphosus* B and add it to No. 1 tube. Do not wash off the growth with the diluted serum.

(3) [Repeat] with cultures of *B. aertryke* and add to No. 2 tube.

(4) Incubate both tubes at 37° C. for two hours, centrifuge until all bacilli are precipitated and the supernatant fluids are clear.

(5) Pipette off fluids into two sterile tubes, and test agglutinating action of both fluids up to a dilution of 1 in 10,000 against *B. paratyphosus* B and *B. aertryke*, remembering, that the serum is already diluted 1 in 50.

After absorption with *B. paratyphosus* B the titre for both organisms will be practically *nil*, or nearly so, (<400). After absorption with the *B. aertryke* the titre for this bacillus will be practically *nil*, or nearly so, (<400) while the titre for the paratyphoid "B" bacillus will be unchanged, or only slightly lessened.

The Diagnosis of Mixed Infections.

The blood of a non-inoculated patient suspected to be suffering from enteric is found to contain a fairly large amount of agglutinins for *B. typhosus* and *B. paratyphosus* B. Is it a case of mixed infection typhoid-paratyphoid B? Or is it a case of typhoid with secondary non-specific agglutinins for *B. paratyphosus* B? Or a case of paratyphoid B with secondary non-specific agglutinins for *B. typhosus*?

(1) After saturation with *B. typhosus* the typhoid agglutinins and the paratyphoid agglutinin have disappeared, or nearly so; after saturation with *B. paratyphosus* B the paratyphoid agglutinin has disappeared, or nearly so, while the typhoid agglutinin remains the same amount. These results show that the typhoid agglutinin is the specific one and the case one of typhoid with coagglutinins for *B. paratyphosus* B.

(2) After saturation with *B. typhosus* the typhoid agglutinin has disappeared, or nearly so, while the paratyphoid B agglutinin remains in the same amount. After saturation with *B. paratyphosus* B, both the paratyphoid and the typhoid agglutinins have disappeared. These results mean that the paratyphoid B agglutinin is the specific one.

(3) After saturation with *B. typhosus* the typhoid agglutinin has disappeared while the paratyphoid B agglutinin remains. After saturation with *B. paratyphosus* B the typhoid agglutinin remains unchanged. The results show that both the typhoid and paratyphoid agglutinins present are specific and the case one of mixed infection.

Diagnosis of Closely allied Bacterial Species and Types.

Suppose we have isolated a bacillus with cultural and biochemical characters of *B. paratyphosus* B, well agglutinated by a paratyphoid B serum. Is it *B. paratyphosus* B, or is it *B. aertryke*? CASTELLANI'S

method gives the answer as shown by the work of BOYCOTT, BAINBRIDGE, and O'BRIEN. If the bacillus is really *B. paratyphosus* B, paratyphoid B serum saturated with the organism we have isolated will lose completely, or nearly, its agglutinin for *B. paratyphosus* B and also its agglutinin for *B. aertryke*. If the germ is *B. aertryke* then paratyphoid B serum when saturated with the isolated bacillus will lose its agglutinating power for *B. aertryke*, but will not lose its agglutinating power for *B. paratyphosus* B.

J. H. T. W.

ECKER (E. E.). **The Pathogenic Effect and Nature of a Toxin produced by *B. paratyphosus* B.**—*Jl. Infect. Dis.* 1917. Dec. Vol. 21. No. 6. pp. 541–553.

"This paper presents the results of experiments which indicate the production of soluble toxins by *B. paratyphosus* B and make it probable that it is to these particular toxins that the bacillus owes its disease-producing power."

As the result of experiments on rabbits with filtered toxins the author concludes that :—

"In broth cultures soluble toxic substances are produced within 24 hours by some strains of *B. paratyphosus* B."

These toxic substances produce constant pathologic effects and are of the nature of true soluble toxins inasmuch as they stimulate the formation of antitoxins.

The toxic substances are comparatively thermostabile since they resist boiling for 5 minutes at 100° C.

From the "table" of results "it appears that a toxic filtrate may be obtained from strains of *B. paratyphosus* B in general when the organisms have been grown in a suitable broth for 8–14 days at 37° C. and that the toxicity is not that of the peptone constituent as such. Cultures in peptone-free mediums did not produce toxic substances. The controls show however, that when upward of 5 per cent. peptone is used in the culture medium the toxicity of this substance becomes a complicating factor, as was undoubtedly the case in much previous work."

J. H. T. W.

i. FORCE (John N.) & STEVENS (Ida M.). **Further Studies on Typhoidin.**—*Arch. Intern. Med.* 1917. Mar. Vol. 19. No. 3. pp. 440–456.

ii. GAY (Frederick P.) & LAMB (Albert R.). **The Application of the Typhoidin Test in a Group of Nurses and Physicians.**—*Jl. Lab. & Clin. Med.* 1917. Jan. Vol. 2. No. 4. pp. 217–221.

These two records refer to the production of a skin reaction indicative of immunity against typhoid fever. "Typhoidin" is injected intra-(not sub-)cutaneously as with Luetin in the Noguchi reaction.

i. "The original typhoidin employed by Gay and Force consisted of a ten-day culture of a single strain of *Bacillus typhosus* on glycerin broth evaporated to one-tenth volume. On account of deterioration of the preparation in this form, Gay and Claypole precipitated the original typhoidin with twenty volumes of alcohol, filtered, washed with absolute alcohol and ether, and then dried on porcelain plates over sulphuric acid in a vacuum. With a freshly prepared suspension of this typhoidin powder

in phenolated saline, equivalent in concentration to the original typhoidin, these authors were able to produce marked intradermal reactions in previously immunized rabbits, but not in controls. The reaction was characterized by the appearance within twenty-four hours of an indurated, reddened papule, which persisted at the site of inoculation for several days. . . . Positive results were secured in ten typhoid cases out of thirteen by a similar injection of Gay-Claypole vaccine, representing a suspension of 0·1 mg. (800 million) dried and ground sensitized typhoid organisms to 1 cc. A red maculopapule appearing at the site between six and forty-eight hours after inoculation was considered positive if it equalled in size the original weal produced by the intradermal injection. . . .

"Out of 108 positive reactions [with a polyvalent typhoidin] the forty-eight hour papule measured 10 mm. or over in twenty-six instances; the average measurement of 108 papules was 8·4 mm."

With an improved vaccine :—

"Out of eighteen normal persons, seventeen gave negative reactions; out of twenty-six persons with a history of typhoid, nineteen gave positive reactions, one gave a doubtful, and six persons (four with questionable typhoid histories) gave negative reactions. Out of 152 persons previously vaccinated against typhoid, twelve of fifty-six vaccinated during 1916, three of eleven vaccinated during 1915, thirteen of twenty-nine vaccinated during 1914, and twenty-six of fifty-two vaccinated during 1913 gave negative reactions."

ii. The vaccine employed was that of FORCE and STEVENS and used by them in procuring the above results, "a polyvalent preparation from several chosen strains of typhoid bacilli . . . a carefully determined minimal effective dose of the dried polyvalent typhoidin (0·00002 gm. in 0·05 cc. of 0·5 per cent. carbolated saline).

"At all events, whatever may be the eventual understanding of a positive typhoidin test, use of its absence as an indication for re-vaccination certainly errs on the side of safety in detecting those individuals who in spite of typhoid vaccination do not show indications of a reaction to the typhoid bacillus, and who are, therefore, presumptively those particular individuals who under ordinary conditions of infection will be found to be the least protected ones."

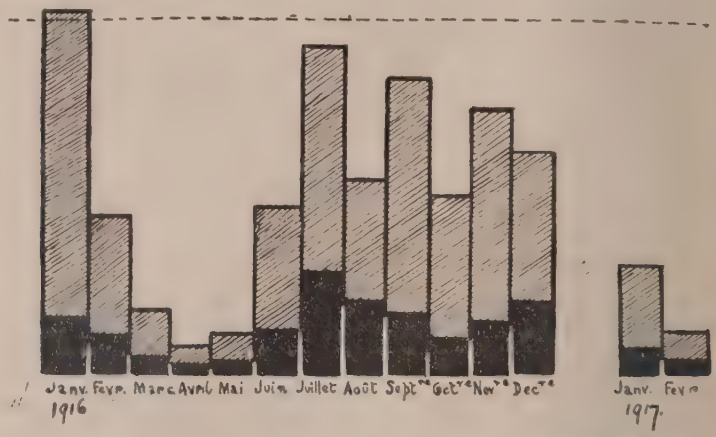
With each paper a bibliography is supplied.

J. H. T. W.

ARMAND-DELILLE (P.), PAISSEAU (G.) & LEMAIRE (H.). **Rôle de la vaccination antityphoïdique et antiparatyphoïdique dans la disparition presque complète des affections typhoïdes et paratyphoïdes à l'armée d'Orient.**—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1917. July 12. 3 Ser. Year 33. No. 23–24. pp. 854–857. With 1 diagram.

"Antityphoid vaccination, at first alone, afterwards combined with antiparatyphoid vaccination . . . has produced, among the troops of the Army of the East, in spite of the defective hygienic conditions in which it was placed, results truly perfect. We insist only on two points in particular; first of all the limitation of typhoid almost exclusively to the non-vaccinated, secondly to the disappearance, almost complete, of paratyphoid, after re-vaccination with T A B vaccines."

The paragraph just quoted gives the value of the work which the authors describe in detail. Mixed vaccination was not thoroughly applied till the end of 1916.



Number of typhoid and paratyphoid cases observed in the Eastern Army, from January 1916 to February 1917, per mille. [Black=typhoid. Hatching=Paratyphoid.]

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In the authors' own words :—" The figures speak for themselves."

J. H. T. W.

DREYER (Georges), GARDNER (A. Duncan), GIBSON (Alex. G.) & WALKER (E. W. Ainley). **Prophylactic Triple Inoculation against Typhoid and Paratyphoid Fevers.**—*Lancet.* 1918. Apr. 6. pp. 498–500.

The main conclusions are :—

" A most important factor affecting duration of immunity is the *time interval allowed between the first and second inoculation.* The length of this interval also strikingly influences the more immediate effect of the administration of a second dose of vaccine. . . .

" A *more lasting immunity is obtained by administering it at a time when the effect of the first has reached (approximately) its maximum* [as shown by the " curve "]. . . .

" We are therefore of opinion that *it would prove advantageous to lengthen the interval between the first and second dose of vaccine from 10 days to 18 or 20 days.*"

J. H. T. W.

i. TAKANO (R.). **[Typhoid Immunisation involving the Entire Population of Lasa, Loochoo Islands.]**—*Saikingaku Zasshi (Jl. Bacteriol.).* 1917. Jan. 15. No. 256. pp. 15–24.

ii. TOYODA (S.). **[Enrichment Method for demonstrating the Presence of Typhoid Bacilli in Contaminated Water.]**—*Ibid.* May 15. No. 260. pp. 391–402.

iii. SAKAGAMI (K.). **[Bacteriocidal Action of Normal Serum against Paratyphoid Bacilli.]**—*Ibid.* June 10. No. 261. p. 510.

[From Reviews by R. G. MILLS.]

i. The island of Lasa is a small rocky portion of the Loochoo islands which was uninhabited until a phosphate mining company imported about 1,500 laborers for the purpose of commercial exploitation. Living conditions were bad owing to poor water supply and an ever increasing mortality from typhoid caused the authorities much concern. The author was called upon to immunize the entire population of the island in an attempt to stamp out the epidemic. One cc. of a sensitized vaccine a month old prepared by the Kitasato Research Dept. was used for each patient. In all 1,290 people were treated, 9 developed the disease within a few days of the injection of whom one died, and 2 light cases broke out 2–3 months after immunization. The reactions noted were all mild in character, 484 patients reaching a temperature of 38° C. and 25 39° C. In a few cases patients already sick with the fever were treated with 2–3 doses of the same vaccine with satisfactory results. The epidemic was stopped and no case of typhoid has occurred for more than 6 months.

ii. Bile powder is made of fresh bile from cattle, sterilized in a boiler, filtered and dried by heat and then over sulphuric acid. This powder is readily soluble in water. A solution is made of 1·0 gm. peptone, 2·5 gm. sodium sulphate, 0·5 gm. salt and 7–8 cc. water. Boil and keep on hand.

For the test 100 cc. of the suspected water is mixed with the solution above mentioned and incubated for 8 hours. Then there is added to it a solution composed of 3 gm. of the bile powder, in 7–8 cc. of distilled water sterilized with steam and mixed with 1 cc. of 1–1,000 crystal violet. This after a thorough shaking is incubated until the next day and it is then plated out on Endo media.

iii. This was found to be a little weaker than the corresponding action against the typhoid organism. It is stronger against A than B.

J. H. T. W.

BOURGES (H.). **Cinq cas de fièvre typhoïde observés chez des sujets ayant subi antérieurement la typho-vaccination préventive.**—*Arch. Méd. et Pharm. Nav.* 1918. Mar. Vol. 105. No. 3. pp. 224–235.

The five cases were treated in the hospital at Brest. Blood culture showed four cases of typhoid infection; the fifth case was due to *B. paratyphosus* A. All five patients recovered. Three of the five had received protective inoculations of CHANTEMESSE'S vaccine; the other two were protected with VINCENT'S vaccine. The chief point of interest appears when the time of the protective vaccination is compared with the date of the attack. In case I the attack appeared *one year* after the date of vaccination; in case II the period between the two events was about *four months*; in case III the time elapsed was *one year* and in the two remaining patients there was a period of about eleven months between the vaccination and the onset of the disease. [These detailed observations confirm the belief, generally held, that the protective power of anti-enteric vaccines is generally exhausted after a period of twelve months.]

J. H. T. W.

BASSETT-SMITH (P. W.). **Antityphoid Inoculations and Cases of Infection during the Third Year of the War.**—*Jl. Roy. Nav. Med. Serv.* 1918. Apr. Vol. 4. No. 2. pp. 141–143.

This report of antityphoid inoculations in the navy carries the record from October 1916 to September 30th, 1917 [see this *Bulletin*, Vol. 9, p. 468]. A triple vaccine was used.

Number of men inoculated.	One inoculation.	Two inoculations.
21,695	1,578	20,117.

The total number of enteric infections was 144.
Typhoid, 93; Deaths, 3 (not inoculated).

Distribution for Place.

	Total	One inoculation	Two inoculations	? Inoculated.	Not inoculated.
England and Home Fleet	26	1	1	—	24
France and Dunkirk	3	—	2	—	1
Mediterranean ..	37	5	10	—	22
Mesopotamia ..	7	—	—	5	2
Africa	5	—	—	2	3
St. Vincent ..	6	—	—	—	6
Elsewhere	9	—	—	1	8
	93	6	13	8	66

Distribution for time after inoculation.

	Months				
	Over (3)	(6)	(12)	(24)	Not stated
6 inoculated once	1	1	2	—	2
13 inoculated twice	—	2	8	2	1

In agreement with most observers Dep. Surgn. Genl. Bassett-Smith, R.N., concludes that protection "appears to be greatly reduced after a period of twelve months, and inoculations should certainly be repeated at the end of eighteen months."

Paratyphoid A—21; 1 death (not inoculated).

	Once	Twice	Doubtful	Not	Total
Mediterranean ..	1	7	1	5	14
Mesopotamia ..	2	2	2	1	7
	3	9	3	6	21

Paratyphoid B—30.

	Total	Once	Twice	Doubtful	Not
England	2	—	—	—	2
France	1	—	—	—	1
Mediterranean ..	19	1	12	1	5
Mesopotamia ..	2	—	—	—	2
Africa	6	—	—	2	4
	30	1	12	3	14

J. H. T. W.

LAROCHE (Guy) & MAZET. **Note sur la vaccination antityphoïdique et paratyphoïdique des Canaques.**—*Bull. Acad. de Méd.* 1918. Mar. 19. 3 Ser. Vol. 79. Year 82. No. 11. pp. 252–255.

Owing, it is stated, to a belief that the Kanakas were exposed to enterica infections in early life and thus acquired immunity, the 500 members of a working-party brought to France were not protected by vaccination. These Kanakas were not of very robust physique and in a short time after their arrival 25 men were down with enteric fever. Blood cultures showed the presence of *B. typhosus*, *B. paratyphosus* A, and *B. paratyphosus* B. Among a similar contingent of vaccinated Tahitians, under similar conditions, no cases occurred.

The authors then inoculated 391 Kanakas using two doses of a triple vaccine; 47 were excluded because they showed signs of dysentery, " malaria " or albuminuria. [With reference to " malaria," see LANDE (P.), this *Bulletin*, Vol. 9, p. 470.] The vaccination was well borne.

J. H. T. W.

GAUDUCHEAU (A.). **Bacille paratyphique de Nam-Dinh.**—*Bull. Soc. Méd.-Chirurg. Indochine.* 1916. July. Vol. 7. No. 7. pp. 239–242.

Refers to a case having the clinical aspect of typhoid fever. After death a bacillus with the characteristics of *B. paratyphosus* B was isolated.

J. H. T. W.

MIRGUET. **La fièvre typhoïde et la javellisation de l'eau de boisson à Sidi-Abdallah, 1913–1917.**—*Arch. Méd. et Pharm. Nav.* 1918. Mar. Vol. 105. No. 3. pp. 205–215.

A full and detailed account of purification of polluted water with hypochlorite of lime; applying the principles originated by JAVELLE:—" Eau de Javelle " : hypochlorite of potassium or sodium.

J. H. T. W.

LE ROY DES BARRES. **Fièvre typhoïde, perforation intestinale laparotomie, suture de la perforation, guérison.**—*Bull. Soc. Méd.-Chirurg. Indochine.* 1917. June. Vol. 8. No. 1. pp. 19–21.

The patient, a young man 21 years of age, was admitted into the Protectorate Hospital, Hanoi, on May 15th, 1917. Evening temperature 39·1° C., with extreme prostration, sub-delirium, dry, baked tongue, slight enlargement of the spleen and constipation, violent pain in the abdomen during the evening of the 16th. Temperature 40° C. on 17th and condition serious on 18th with vomiting and signs of perforation. There was marked peritonitis and the fluid in the pelvis had a faecal odour. In the ileum close to the caecum a perforation was found about 1·5 mm. in diameter. During the operation an Ascaris passed through the hole in the gut. A small dose of castor oil given on the 21st was followed by expulsion of six Ascaris. Recovery was steady and the patient was discharged cured on June 27th.

For similar operations see this *Bulletin*: TAKAKI (Y)., Vol. 8, p. 83.

J. H. T. W.

PLAGUE.

CORNWALL (J. W.) & MENON (T. Kesava). **On the Possibility of the Transmission of Plague by Bed-Bugs.**—*Indian Jl. Med. Res.* 1917. July. Vol. 5. No. 1. pp. 137–159.

The preliminary investigations made in connection with this research were in full agreement with the observations of BACOT and other workers, in that a large proportion of the bugs infected with the strain of *B. pestis* used succumbed in a few days, the time of the survival having some relation to the dose of the bacilli. Two methods of infection were employed—(1) by feeding the bugs artificially through a membrane of rabbit skin on citrated rabbit blood mixed (a) with plague bacilli in such numbers that every bug that fed was certain of a heavy infection, (b) with a broth culture diluted 1/10,000 and 1/100,000; (2) by feeding them directly on the clipped abdomen and groins of septicaemic guinea-pigs. The results obtained by either method were substantially the same. Non-pathogenic organisms, "a tetra bacillus isolated from the air and a water bacillus isolated from the tap," also proved to be pathogenic to the bug, though they were quite harmless to guinea-pigs on subcutaneous inoculation. The following Table shows the lethal effect of the ingestion of plague bacilli by bugs.

Eleven bugs fed on citrated rabbit blood mixed with a culture of *B. pestis*.

		Examination of stomach contents.	
		Microscope.	Culture.
After 1 day	..All alive	..	..
„ 2 days	..1 dead	+	+
„ 3 „	..2 „	+ in both	+ in both
„ 4 „	..1 „	+	+
„ 6 „	..3 „	+ in all	+ in all
„ 8 „	..1 „	+	+
„ 10 „	..1 killed	+	+
Total	9		

With regard to the actual transmission of plague by means of infected bugs, the authors observe that "no one but Verjbitski has as yet had any success," though "Bacot reports one death among rats after feeding plague infected bugs on them, but does not state that the cause of death was verified." The authors' own experiments show that while plague bacilli can survive and multiply in the stomach of the bug, in one case for at least 38 days, and retain their virulence for guinea-pigs, all attempts to transmit plague to these animals by means of bites of infected animals failed.

In their experiments they demonstrated that bugs cannot regurgitate their stomach contents in the act of feeding and if infection be transmitted at all through feeding, it must be due to the washing out of the bacilli, which have been stranded in the sucking tubes, by means of the bugs' saliva.

In some cases *B. pestis* was isolated from the sucking tube 46 hours after the infecting feed. Infection by such means is only likely to happen if the bug has not satisfied its appetite on the infected host and has an opportunity of feeding on a fresh host before it has troubled to clean out its sucking tube.

In conclusion it is observed that it cannot yet be stated whether bugs can or cannot transmit plague by biting, but that the likelihood of the transmission of human plague by bugs in biting under natural conditions is small.

R. St. J. Brooks.

OTTEN (L.). **Over den infectiositeitsduur der Indische rattevloo** (*Loemopsylla cheopis*). [The Duration of Infection of the Indian Rat Flea.]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1917. Vol. 57. No. 2. pp. 309–315.

The results of these transmission experiments are somewhat similar to those obtained by BACOT in 1915 [see this *Bulletin*, Vol. 5, p. 393]. BACOT's work was carried out in England with mice and with *Ceratophyllus fasciatus* as the infecting flea, while these experiments were made in Java with three different species of rats and with *Loemopsylla* (*Xenopsylla*) *cheopis* as the vector of plague.

The experiments were commenced in January 1916; the three species of rats used being *Mus rattus griseiventer*, the common house rat, *Mus concolor*, the small house rat and *Mus diardii*, the field rat. Each species was placed in a separate cage, which contained a countless number of fleas, which had fed on three septicaemic rats as a source of infection.

During the first week the rats were only placed a few hours in the cages for fear of re-infection. Fresh rats were put in at intervals of three days, so as not to lose many fleas through too frequent chloroforming of the rats. The results of these experiments are shown in the table on following page.

It will be observed that the longest infection period was 43 days in the case of *Mus concolor*, 37 days for the field rat and 36 days for the common house rat.

R. St. J. B.

HATA (H.). **[Pest Dissemination through the Agency of Fleas.]**—*Saikingaku Zasshi* (*Jl. Bacteriol.*). 1917. Feb. 10. No. 257. pp. 131–148.

[From Review by R. G. MILLS.]

The idea that plague is perpetuated by the eating of carcases of rats which have died from the disease would presuppose a larger percentage of mesenteric gland infection than has been met with in

House Rat.	Placed in cage.	Taken out of cage.	No. of hours Exposed to Infection.	Died of Plague.	Duration of Infectivity.
No. 1	3·1	3·1	3	6·1	3
No. 2	6·1	6·1	5½	8·1	6
No. 3	9·1	9·1	4	11·1	9
No. 4	12·1	12·1	5	14·1	12
No. 5	15·1	15·1	4	18·1	15
No 6	18·1	18·1	7	21·1	18
No. 7	21·1	21·1	5	24·1	21
No. 8	24·1	24·1	5½	27·1	24
No. 9	27·1	27·1	5	30·1	27
No. 10	30·1	31·1	24	2·2	30
No. 11	2·2	3·2	24	5·2	33
No. 12	5·2	6·2	24	8·2	36
No. 13	8·2	9·1	24	—	
No. 14	11·2	12·2	24	—	
No. 15	14·2	15·2	24	—	
No. 16	17·2	18·2	24	—	
No. 17	20·2	—	—	—	

Concolor.	Placed in cage.	Taken out of cage.	No. of hours Exposed to Infection.	Died of Plague,	Duration of Infectivity.
No. 1	2·1	2·1	3	6·1	3
No. 2	6·1	6·1	5½	9·1	7
No. 3	9·1	9·1	4	13·1	10
No. 4	12·1	12·1	5	17·1	13
No. 5	15·1	15·1	4		16
No. 6	18·1	18·1	7	21·1	19
No. 7	21·1	21·1	5	24·1	22
No. 8	24·1	24·1	5½	—	25
No. 9	27·1	27·1	5	—	28
No. 10	30·1	31·1	24		31
No. 11	31·1	1·2	24	4·2	32
No. 12	2·2	3·2	24	6·2	34
No. 13	5·2	6·2	24	—	37
No. 14	8·2	9·2	24	—	40
No. 15	11·2	12·2	24	15·2	43
No. 16	14·2	15·2	24	—	
No. 17	17·2	18·2	24	—	
No. 18	20·2	—	—	—	

Field Rat.	Placed in cage.	Taken out of cage	No. of hours Exposed to Infection.	Died of Plague.	Duration of Infectivity.
No. 1	2·1	2·1	3	—	3
No. 2	6·1	6·1	5½	11·1	7
No. 3	9·1	9·1	4	12·1	10
No. 4	12·1	12·1	5	17·1	13
No. 5	15·1	15·1	4	19·1	16
No. 6	18·1	18·1	7		19
No. 7	21·1	21·1	5	25·1	22
No. 8	24·1	24·1	5½	—	25
No. 9	27·1	27·1	5	31·1	28
No. 10	30·1	31·1	24	—	31
No. 11	2·2	3·2	24	—	34
No. 12	5·2	6·2	24	10·2	37
No. 13	8·2	9·2	24	—	
No. 14	11·2	12·2	24	—	
No. 15	14·2	15·2	24		
No. 16	17·2	—	—	—	—

the experience of the author. His examinations, carried out at Hyoko Province, Japan, have resulted as follows :—

Date.	Submaxillary Gland	Axillary Gland.	Inguinal Gland.	Submaxillary and Inguinal Glands.	Lumbar Gland.	Septicaemia.
1909–1910	15·4 p.c.	16·1 p.c.	28·6 p.c.	—	—	39·7 p.c.
1913–1914	19·4 p.c.	12·3 p.c.	17·6 p.c.	17·3 p.c.	17·6 p.c.	—

In view of these results the conclusion is arrived at that the infection must have reached the glands from the skin rather than from the intestines, thus strengthening the view that it was conveyed by flea infection rather than by feeding on infected material.

R. St. J. B.

DE RAADT (O. L. E.). **De rol van de huisrat in de epidemiologie der pest.** [The Rôle of the House Rat in the Epidemiology of Plague.] —*Geneesk. Tijdschr. v. Nederl.-Indië.* 1917. Vol. 57. No. 4. pp. 520–533.

In this communication de Raadt re-affirms his conclusions with regard to the signification of the " house-rat "—*Mus rattus grisieventer*, in relation to the spread of plague from district to district in Java. He regards the investigations of OTTEN (which tend to dispute this opinion) as incomplete, and not invalidating in any way the case already made out for the house rat as a carrier of plague, by van LOGHEM, SWELLENGREBEL and himself, in previous communications. [See this *Bulletin*, Vol. 9, p. 477.]

R. St. J. B.

GENEESKUNDIG TIJDSCHRIFT VOOR NEDERLANDSCH-INDIË. (Bijblad van het.) 1916. Vol. 55. No. 4. 98 pp. **Dienst der Pestbestrijding. Verslag over het vierde kwartaal 1915 tevens jaarverslag.** [Report of the Plague Prevention Service for the Fourth Quarter of 1915, with Annual Summary.]

Report of the Plague Prevention Service for Eastern Java [for the previous quarter see this *Bulletin*, Vol. 9, p. 84]. A Table shows the case-incidence for the various districts concerned in comparison with the corresponding quarter of the four preceding years.

A considerable decrease in the number of cases is shown as compared with the corresponding quarters of the two preceding years. The total number of cases for the year 1915 was 6,237, as compared with 15,758 for 1914, and 11,386 for 1913. Of the 6,237 cases reported only 267 recovered (a percentage of 4·3).

Between August 20th and December 15th of the current quarter 601 rats were examined for fleas, the flea-index for *Mus decumanus* being 5·0, and for the house rat 5·5.

J. B. Nias.

DE RAADT (O. L. E.). **De Pestbestrijding voorheen en thans.** [Plague Combat—Past and Present.]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1917. Vol. 57. No. 3. pp. 342–346.

The author discusses the various methods applied in the past in connection with plague eradication, such as the evacuation of the infected populations into central barracks, the sulphur fumigation of the infected houses and also the system of temporary improvement of the dwelling houses, at present in vogue in Java. He points out the extreme difficulty and unpopularity of the methods of evacuation employed and also the very considerable cost of such procedure to the State. A judicious combination of the various methods used from time to time probably yield the best results.

R. St. J. B.

PARRY (R. C.). **Pneumonic Plague Prevention on the Tibetan Border.** —*China Med. Jl.* 1918. Jan. Vol. 32. No. 1. pp. 81–87.

A small epidemic of what appears to have been pneumonic plague, broke out in the autumn of 1915 on the Tibetan border at the village and monastery of Mai-uh and infection was carried thence by a merchant to the town Taochow. The outbreak followed the skinning and eating of a marmot (Tarbagan) found dead on the hills. The state of affairs at Taochow was made known to the author by a local missionary and immediate steps were taken, in co-operation with the Chinese Governor-General, to send a relief party to the infected district and to provide funds to meet all expenses. After many vissitudes the little expedition reached its destination where it was found that 17 deaths from the disease had already taken place. In spite of great opposition from the Moslem population the city was put under strict quarantine and arrangements were promptly made for the isolation and treatment of the sick and their contacts, the burial of the dead and the disinfection, or demolition by burning, of infected premises. These measures appeared to have been entirely successful and the epidemic had quite spent itself by the time the expedition returned to its head-quarters. [No bacteriological diagnosis of the disease appears to have been made.]

In conclusion it is remarked that "the symptoms of the disease as seen in Taochow resembled rather closely those which marked the Manchurian outbreak, judging by reports at that time, but the disease in Taochow seems to have been less virulent, less infectious. The intensely cold weather of the high altitudes in this part of the world may have reduced the viability of the infecting bacilli, and the great distances and poor means of communication between one district and another probably did much to check the spread of the epidemic."

R. St. J. B.

DAVIES (D. S.). **Notes on Plague in Bristol in 1916.** *Bristol Medico-Chirurg. Jl.* 1917. Vol. 35. No. 132. pp. 16–18.

This is a brief note on the methods adopted by the Public Health Authorities in combating the small outbreak of rat plague which occurred in Bristol in the autumn of 1916 [see this *Bulletin*, Vol. 10, p. 286]. The work appears to have been done very thoroughly, the warehouse in which the infection originated, and its contents, being destroyed by fire after elaborate precautions had been taken to prevent the escape of possible infected rodents.

A large area surrounding the district was mapped out, inspected in detail and rat-catching systematically carried out for six months. Over 9,000 rats were caught, and of these nearly 2,000 were examined at Bristol University Laboratory for evidence of plague. No plague rats were found in the Port or City other than those actually in the warehouse itself, and no further cases have occurred. No explanation has been forthcoming of the "one spot infection" in the centre of the city, which may have been accidental or intentional.

R. St. J. B.

CREEL (R. H.) & SIMPSON (Frieneh). **Rodent Destruction on Ships. A Report on the Relative Efficiency of Fumigants as determined by Subsequent Intensive Trapping over a Period of one Year.**—*Public Health Rep.* 1917. Sept. 7. Vol. 32. No. 36. pp. 1415–1450.

In these experiments the authors have put the relative efficiency of fumigation by cyanide gas and sulphur dioxide respectively to a practical test. A combination of circumstances at New Orleans made such a test feasible, the favourable circumstances being the fumigation of a large number of vessels at the port of New Orleans and at the Service quarantine station, and the availability of a large and experienced force of trappers.

The proportion of cyanide used was 5 ounces per 1,000 cubic feet of space with duration of exposure of 1¼ hours for holds and one-half hour for superstructures. Sulphur when used was in the proportion of 3 pounds per 1,000 cubic feet of space, with duration of exposure of 6 hours for holds and superstructures alike.

The following Tables, taken from the authors' paper are self-explanatory :—

TABLE I.

Nature of fumigant.	Number of vessels treated.	Number of rats killed by fumigant.	Number of rats trapped.	Percentage of efficiency of fumigant.
				per cent.
Sulphur dioxide	62	747	223	77
Cyanide gas ..	182	2,811	121	95

TABLE II.

Nature of fumigant.	Number of vessels recorded.	Compartment of vessel considered.	Number of rats killed by fumigation.	Number of rats subsequently trapped.	Percentage of efficiency of fumigant.
Sulphur dioxide ..	32	Superstructure*	133	107	55
Cyanide gas ..	31	do.*	729	45	94
Sulphur dioxide ..	28	Holds (empty)	702	28	96
Cyanide gas ..	34	do.	854	9	99
Sulphur dioxide ..	10	Holds (loaded)	104	59	64
Cyanide gas ..	10	do.	80	20	80

*Superstructures include storerooms, crews' quarters, cabins, poop deck, etc.

"The results obtained from the two methods of fumigation are contrasted and indicated in the table, and it will be noted that there is a very marked disparity in the efficiency of sulphur dioxide as compared with cyanide gas, in the treatment of superstructures. These compartments, such as store rooms, poop decks, crews' quarters, etc., are generally partially filled with supplies, stores, dunnage, etc., and it would appear that the greater effectiveness of cyanide gas is due to its greater penetrating powers, as well as toxicity. It may also be that sulphur dioxide, on account of its odor, may provide more of a warning to the rats and enable them to secure greater protection; whereas cyanide with less odor and without the physically irritating properties of sulphur dioxide, may result in the destruction of the animal before it can secure available covert.

"In the fumigation of the empty holds of vessels there is no material difference in the results obtained, although here as elsewhere there should be considered the difference in the length of exposure. Considering the respective gases, the results on vessels fumigated with cargo-laden holds indicate a greater efficiency for cyanide gas, although the number of vessels tabulated is rather small for the establishment of any general conclusions. Conditions in storerooms, crews' quarters, poop decks, etc., are more or less similar to those of loaded holds, and on the basis of the results of the fumigation of these superstructures, it is believed that it can safely be asserted that cyanide gas is far more effective in the fumigation of loaded holds than is sulphur dioxide."

R. St. J. B.

BRAYNE (W. F.). **Intravenous Eusol in Plague.**—*Indian Med. Gaz.* 1917. Sept. Vol. 52. No. 9. pp. 322–323.

The treatment of plague by means of intravenous eusol solution was suggested by CONNOR in 1916 [this *Bulletin*, Vol. 8, p. 258]. This method of treatment has been carried into effect in a case of pneumonic plague with highly successful results. The eusol solution was prepared as follows:—

"One litre freshly distilled water to 12½ grammes boric acid and 12½ grammes chloride of lime. To the resulting eusol 8·5 grammes sodium chloride per litre were added. Subsequent estimation of the chlorine content of the chloride of lime, which was the best procurable at the time, showed that it was only half strength. So the eusol was weaker than that used by previous observers."

The case under treatment was one of typical pneumonic pest. The sputum was characteristic and was crowded with bi-polar staining bacilli and contained much elastic tissue. 75 c.c. eusol were prepared as above and given intravenously. After an initial rise of temperature and rigor the temperature fell steadily and was normal ten hours after injection. Plague bacilli had disappeared from the sputum in three days and the patient made an uninterrupted recovery.

This successful result of eusol treatment was not repeated in connection with bubonic plague; the drug did not appear to influence the course of the disease. The eusol could not, apparently, act on the bubo in the same manner as it might be supposed to act on the lungs. The use of stronger eusol solution and the extirpation of the buboes is suggested.

R. St. J. B.

EBERSON (Frederick). **Active Immunity to Systemic Plague Infection.** —*National Med. Jl. of China.* 1917. Dec. Vol. 3. No. 4. pp. 125–140. *Jl. Infect. Dis.* 1918. Jan. Vol. 22. No. 1. pp. 62–73.

The close relationship of the phenomenon of antianaphylaxis and that of resistance to proteotoxin suggest the feasibility of applying the facts concerning the former to any method involving apparently similar principles. Repeated amounts of protein at short intervals result in a state of antianaphylaxis or immunity to later injections.

It seems reasonable, therefore, to assume that repeated injections of proteotoxin, if this contains specific substances of the plague organism, will give rise to an immunity towards plague itself.

In these experiments the materials used in the production of proteotoxins were *B. pestis*, anti-pest serum from rabbits injected with plague bacteria, and normal horse serum. *B. pestis* was grown on plain agar slants and incubated at from 30° to 35° C. for 24 hours. The slants were of approximately uniform size, and experience with the inoculation of cultures made it possible to attain considerable accuracy for the purpose. Sensitizer was obtained according to the following method: Healthy rabbits, in weight between 1,200 and 1,600 gm., were injected with plague bacilli emulsified in salt solution and heated for 30 minutes at 58° C. At first, intravenous injections were made, but it was found that intraperitoneal inoculation was attended with less danger of sudden death due to agglutination in the capillaries, and likewise was capable of producing a serum potent enough for the purpose. In addition, this method of injection seemed to be more easily borne by the animals. The amount of culture, given at weekly intervals, was gradually increased from 0·1 of a slant up to a whole slant, the dosage usually being 0·2, 0·4, 0·6 of a slant for the second, third and fourth inoculations. At times, this treatment was modified according to the reaction of the animal so that a whole slant was injected one week after the third dose of 0·4 or 0·5 of a culture. On an average the rabbits received four doses. The criterion was always serum so obtained, which was measured microscopically for its agglutinating power. This seemed rather remarkable in its rapidity, for when the bacterial suspension received the heated sensitizer, an almost immediate flocculation ensued, and within a few minutes

the bacteria formed minute clumps in a clear fluid. Within 30 minutes at body temperature, the organisms always settled to the bottom of the tube, leaving a clear fluid above.

Horse serum was prepared in the usual way from the jugular vein. No serum was used which exceeded eight weeks in age.

The preparation of proteotoxin was as follows:—Agar slants of *B. pestis* were washed off with 0·25 c.c. salt solution, and sensitizer, heated at 56° C. for 30 minutes, was added to the emulsion in the proportion of 1·5 to 2·0 c.c. for each 1·5 slants. After one hour's incubation at 37° C. the material was centrifugated for ten to fifteen minutes, the supernatant fluid pipetted off and the bacterial sediment washed once with salt solution. Normal horse serum was then added to the sensitized complex in amounts of 10 c.c. for each 1·5 slants of *B. pestis* used. The final mixture was placed in large centrifuge tubes and incubated for 14 hours at 35° C. to 37° C. At the end of this period, the material was centrifugated for one hour at moderate speed. The supernatant fluid when pipetted off was clear and gave no turbidity on agitation. Tests for the presence of *B. pestis* were invariably negative. Prior to injection the clear fluid was heated to 56° C. for 30 minutes.

Except where otherwise indicated the intraperitioneal method of injection was used. The absorbtion by this route seemed to be slower and in the amount given, devoid of shock, which was usually so severe in the case of intravenously injected (marginal vein) animals that death supervened within a few minutes. Very often the rabbit thus treated died within a day or two, or at the most after a week, with severe emaciation and slow poisoning. Intraperitoneally administered, the proteotoxin caused no visible disturbance in the animal other than a slight uneasiness at first. Ten to eleven days after the last injection with proteotoxin virulent *B. pestis* was administered.

The following conclusions are arrived at:—

"The treatment of rabbits with proteotoxins obtained with *B. pestis* confers a definite resistance on the part of the animal to systemically introduced plague organisms.

"There is apparent protection in at least 75 per cent. of the animals treated, taking the entire number of cases into consideration. Below a certain dose of bacteria, the protection conferred is much greater.

"Combined intravenous and intraperitoneal injections of the proteotoxin seem to be more effective than either method by itself, although intraperitoneal treatment of rabbits results in a powerful resistance to plague bacteria administered by that route.

"The immunity, so far as it has been possible to determine in these experiments, is definitely marked for at least one month after treatment.

"Injections given at intervals of two to three weeks give rise to a definite resistance to inoculation with living virulent plague bacilli.

"*B. pestis* appears to be the matrix for a specific poisonous substance of the nature of proteotoxin, and capable of inducing a specific resistance to the organism which is used in the manufacture of the toxic element.

"Observations so far support the hypothesis that one of the most potent factors in the protective mechanism is that of leucocytosis."

R. St. J. B.

DRENNAN (Jennie G.) & TEAGUE (Oscar). **A Selective Medium for the Isolation of *B. pestis* from Contaminated Plague Lesions and Observations on the Growth of *B. pestis* on Autoclaved Nutrient Agar.**—*Jl. Med. Res.* 1917. July. Vol. 36. No. 3. (Whole No. 163.) pp. 519-532.

An attempt has here been made to evolve a medium on which plague bacilli derived from contaminated sources, such as decomposing rat carcasses, will flourish by means of the selective inhibition of the contaminating bacteria present. The work was inspired by the researches of CHURCHMAN and others with regard to the inhibiting action of Gentian violet on certain bacteria. It was found that gentian violet inhibited the growth of *B. subtilis* but did not affect the growth of *B. prodigiosis*, and the conclusion was arrived at that bacteria could, on that account, be divided into two classes, viz., those violet-positive and those violet-negative; the former corresponding to the Gram-positive organisms and the latter to the the Gram-negative. This distinction was found to hold good for most of the common Gram-positive and Gram-negative organisms.

The stock agar used in the authors' experiments was prepared as follows:—One pound of beef-heart was passed through a meat-chopping machine and soaked in one litre of distilled water over night in the ice-box. The fluid was squeezed through cheesecloth, heated to boiling, and filtered through filter paper. One per cent. peptone, one-quarter per cent. sodium chloride, and one and one half per cent. agar were added; four c.c. of normal NaOH solution was added to prevent a too high degree of acidity, and the mixture was heated for 30 minutes in the autoclave at 15 lbs. pressure. The medium was titrated to +1 (hot titration), cleared with egg-white, filtered through cotton-wool and stored in flasks. It was found that when a mass of plague bacilli were inoculated upon this nutrient agar an abundant growth developed, but if isolated plague bacilli were scattered over the surface of the agar they did not grow into colonies. It was thought that toxic substances were developed in the agar during the sterilization by heat and it was found that by adding a small quantity (·025 per cent.) of sodium sulphate to the medium, immediately before beginning the sterilization, this effect was neutralized.

Various quantities of different aniline dyes were then added to the sulphated agar to determine their relative efficiency in inhibiting the growth of contaminating micro-organisms without prejudicing the development of any plague bacilli present. Hoffman violet, for example, was found to be eight hundred times more toxic for the *Staphylococcus aureus* than for *B. pestis*, nile blue five hundred times, crystal violet one hundred and forty times, and so on. Tests carried out with decomposing plague infected spleen and bubo indicated that nutrient agar containing 1/700 per cent. crystal violet was probably the most effective medium of those tried.

Grübler's stains were used exclusively in the experiments made. All cultures of *B. pestis* were incubated at 30° C., the optimum temperature for this organism.

R. St. J. B.

SAMESHIMA (K.). **[Plague Bacilli in a Cat.]**—*Saikingaku Zasshi* (*Jl. Bacteriol.*). 1917. Apr. 20. No. 259. p. 6.

[From Review by R. G. MILLS.]

In October 1916 in Yokkaichi, where plague was quite prevalent in rodents, a cat was found dead and examined bacteriologically. From the organs of the animal typical plague bacilli were isolated, which gave positive agglutination to a dilution of 1–320.

R. St. J. B.

SUKEGAWA (K.). **[Rat Septicaemia produced by a Bacillus resembling** *B. pestis*].—*Saikingaku Zasshi* (*Jl. Bacteriol.*). 1917. Jan. 15. No. 256. pp. 38–46.

[From Review by R. G. MILLS.]

During routine examinations of rats for the presence of plague infection an organism, resembling *B. pestis*, but of an unusual type was discovered. Morphologically it was slightly larger than *B. pestis* and had blunt extremities. The organism did not possess spores or capsule, was Gram-negative, non-motile, aerobic and grew readily on ordinary media. On agar the colonies were dew-drop like, sticky and stringy in consistency. Colonies had a concentric appearance and did not spread very broadly over the medium. No involution forms appeared on salt agar. The colonies were small and flat on gelatin and in stabs there were few lateral projections and no liquefaction of the medum. There was no fermentation in sugar media. In broth there was a heavy sediment and the organisms took on a diphtheroid appearance. No indol was produced in peptone solution and milk was coagulated in three days.

Guinea-pigs showed very little pathological change on inoculation with cultures of the organism, but rats and mice were much more susceptible and in them slight oedema and injection of the tissues around the point of inoculation were observed. Large doses inoculated into the abdominal cavity caused hyperaemia at the site of puncture and the subsequent death of the animal, but with smaller doses a chronic condition was produced. The abdomen was distended with a dirty grey fluid, punctate haemorrhages were scattered through the organs and many foci of infection were seen in the viscera, especially the spleen, from which a bi-polar organism could uniformally be isolated. In animals killed during the chronic stage the mesenteric glands were greatly swollen, the cervicals were dark red, large and full of tubercle-like foci. Ducks, chickens and doves were not infected.

Serum reactions with this bacillus and with *B. pestis* gave definite proof of the difference between the two organisms. Immune serum derived from the new bacillus could protect against a lethal dose of the organism, against which anti-plague serum gave no protection whatever.

R. St. J. B.

Book Review.

WATERS (Ernest E.) [M.D. (Edin.), M.R.C.P. (Lond.), Lt. Col. I.M.S.]. **Diabetes. Its Causation and Treatment (with Special Reference to India).**—ii + 170 pp. 1917. Calcutta: Thacker, Spink & Co. [Price Rs.4.]

Although the title of this book stands unqualified, the author deals only with Diabetes mellitus or Glycosuria. Within its modest limits the work contains the most modern views as to treatment, full information for the student and practioner, and a message of hope for the sufferer.

Sugar is as necessary to the animal as to the plant, and is carried in the blood stream of the one as in the sap of the other. In health the sugar intake is stored as glycogen in the liver and the muscles; a small amount is used for production of energy and, if there be still excess of supply beyond what is required for such demands, such excess goes to help in the formation of fat. Col. Waters gives the normal blood content of sugar in Bengalis as 0·130 per cent., while in Europeans the estimated percentage is 0·080 (McCAY). The estimates for Indians were made by the Benedict-Cammidge method, chosen on account of simplicity. The necessary reagents and apparatus are fully and carefully described. It must of course be remembered that the tolerance of carbo-hydrates varies in healthy persons of the same race and differs still more in races using different diets. The percentage of sugar may, therefore, vary within fairly wide limits as is shown by Col. Waters: "Taking 50 normal Bengalis the minimum was 0·087 and the maximum 0·18."

But, let there be some obstruction or breakdown in the mechanism which controls sugar metabolism, either in the brain, in the pancreas or elsewhere, and straightway the normal process is upset and sugar appears in the urine. In chapter 2 the best and most modern tests, qualitative and quantitative, are described in detail. The author recognizes the value of an accurate knowledge of the total daily output of sugar in the total amount of urine as expressed in grains. "A patient is not much interested in the difference between 5 per cent. and 2 per cent. of sugar, but if he be told that his sugar output has dropped from 1,200 grains to 150 grains per diem, he feels that some real progress is being made with his case, and is proportionately encouraged."

The classification, symptoms and complications of diabetes receive the same detailed consideration as is given to the physiology and pathology of the disease. The various possible causes of diabetes are discussed; but, although we may safely say that we know the conditions and consequences of the malady the true cause is still among "the waste of things unknown."

The most important chapters are those dealing with treatment. Col. Waters emphasizes the fact that "to ask an Indian vegetarian patient to live on a carbohydrate-free diet" is to advise an impossibility. Even with Europeans and Eastern, or Western, races using a mixed diet it has not up to now been possible to lay down any really satisfactory line of treatment. We, therefore, welcome with satisfaction a modern and at least rational attempt to deal with the relief of the malady even though cure is still unattainable. Passing over the systems in use up to the present time we arrive at the method of treatment "by alimentary rest, after the plan devised by ALLEN." Dr. ALLEN's system (*Boston Med. & Surg. Jl.* 1915, Feb.) rests on the belief that "diabetes is first a weakened function of carbohydrate mechanism, subsequently a weakening of protein metabolism, and finally in the severer cases, imperfect metabolism of fat." He believes that the body of the diabetic may if freed from sugar by starvation be gradually re-educated to deal with small and increasing amounts of carbohydrate material. In these days when brevity is the soul of economy full details of the method cannot be given in a review, but it may at least be said that ALLEN's statistics and the cases quoted and described by Col. Waters strongly support the theory. This part of the author's work, so important to the relief of vegetarian races in India, is indeed good

tidings. For its success, however, it requires intelligent cooperation between doctor and patient. Col. Waters shows how difficult it is to get even educated patients to submit loyally to the only conditions which can bring relief and change a life of misery into a life of comparative comfort. Of other methods of treatment by dieting and of the use of drugs in diabetes the book contains a fair statement. One great advantage of the "re-education" treatment is that it ignores all sham "diabetic foods" offered to the sufferer asking for bread.

Owing to the home and origin of the new treatment most of the statistics relate to a temperate climate and to white races. The author gives full notes of a small number of cases treated in Bengal, Europeans and Indians. In time more results will accumulate and it will be possible for investigators in India to settle certain questions of considerable interest. One point to be considered is whether coma and acidosis are more, or less, prevalent among races dwelling in a tropical climate than among races in temperate zones. Work in this connection has already been carried out in the tropical Atlantic region—cf. *Bulletin,* 1917, Vol. 10, p. 46. Professor Delgado Palacios working in the bio-chemical laboratory of the Caracas University has reported that, in diabetes, coma is almost unknown in Venezuela.

The book is very free from errors and actual misprints, but one slight defect, for which the author is not responsible, distracts the reader's attention. The type has not been properly wedged and many letters are found out of the ranks or in abnormal attitudes.

J. H. Tull Walsh.